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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of Southern California Edison Company (U338E) for Approval of its 2012-2014 California Alternate Rates for Energy (CARE) and Energy Savings Assistance Programs and Budgets.	Application 11-05-017 (Filed May 16, 2011)
And Related Matters.	Application 11-05-018 Application 11-05-019 Application 11-05-020

ADMINISTRATIVE LAW JUDGE'S RULING ADMITTING THE ENERGY SAVINGS ASSISTANCE PROGRAM IMPACT EVALUATION FINAL REPORT

The attached Energy Savings Assistance Program Impact Evaluation Final Report Study, dated August 30, 2013, is ruled into the record of the above-captioned consolidated proceeding, for the Commission's consideration.

IT IS SO RULED.

Dated August 1, 2014, at San Francisco, California.

/s/ KIMBERLY KIM
Kimberly Kim
Administrative Law Judge

ATTACHMENTS:

2011 Energy Savings Assistance Program FINAL REPORT

AND

REPORT APPENDICES

PY2011 Energy Savings Assistance Program Impact Evaluation

Final Report

August 30, 2013

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Executive Summary

The Energy Savings Assistance (ESA) Program, formerly referred to as the Low Income Energy Efficiency (LIEE) Program, provides energy efficiency measures and services at no cost to qualifying low-income customers of California's four investor-owned utilities (IOUs), Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SoCal Gas), and the San Diego Gas and Electric Company (SDG&E). The ESA Program is administered by the IOUs in their respective service areas. This report presents the findings of the impact evaluation of the ESA Program for Program Year 2011 (PY2011) conducted by Evergreen Economics, CIC Research, and Michaels Energy.

ESA Program Delivery Overview

Initially established by the California Public Utilities Commission (CPUC) in the early 1980s,[1] low-income energy efficiency programs provided a channel for low-income customers to receive services similar to those provided by the energy efficiency programs instituted in response to the energy crisis of the 1970s. Subsequent legislation through the early 2000s continued to allow for the provision of energy efficiency measures to low-income customers in California.[2] Following the 2001 California energy crisis and an unanticipated increase in energy prices in 2005, the CPUC took increasingly aggressive approaches to low-income efficiency programs, expanding services and marketing activities, funding and income eligibility levels.[3]

In D. 07-12-051, the CPUC committed to expanding low-income programs by making them available to more customers, improving their cost effectiveness and designing them in ways to make them a reliable energy resource. To achieve these objectives, it adopted a programmatic initiative to provide all eligible low-income customers the opportunity to participate in the ESA Program and to offer those who wish to participate all cost-effective energy efficiency measures in their residences by 2020. The IOUs' 2009-11 ESA programs were to be treated as resource programs by focusing on energy savings, while improving the customers' quality of life. Budgets were also increased substantially in order to treat 25 percent of the overall 2020 goals within the 2009-11 program period.

Both home owners and renters may participate in the ESA Program if they have an account with an IOU offering the ESA Program and meet low-income qualifications. Eligibility for the ESA Program is determined by income-level and household-size guidelines established by the CPUC, which are updated annually to account for inflation. As indicated above, in 2005's Decision 05-10-044, the CPUC expanded the criteria for low-income program eligibility to include customers at or below 200 percent (an increase from 175 percent) of the Federal Poverty Level guidelines, regardless of elderly or disability status.

Customers may also be eligible to participate in the ESA Program if they have already been enrolled in one of the following low-income programs that require income verification:

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[1] See CPUC D.92653, D.82-02-135, D.82-11-019 and D.82-11-086.
[2] See Pub. Util. Code § 2790, Pub. Util. Code § 382, SB 845, AB 1890, AB 1393 and SBX15.
[3] See CPUC D.01-05-033, D.01-08-065, D.05-10-044, D.06-12-036 and D.06-12-038.

- Bureau of Indian Affairs General Assistance
- CalFresh/Supplemental Assistance Program (SNAP)
- CalWORKS/Temporary Assistance for Needy Families (TANF)
- Head Start income Eligible (Tribal Only)
- Healthy Families A&B
- Low Income Home Energy Assistance Program (LIHEAP)
- Medicated/Medi-Cal
- National School Lunch Program (NSLP)
- Supplemental Security income (SSI)
- Tribal TANF
- Women, Infants, and Children Program (WIC)

Evaluation Objectives

The PY2011 ESA Impact Evaluation is one of four low-income program studies that the CPUC directed the IOUs to undertake in Decision 12-08-044. In this Decision, the CPUC directs the IOUs to conduct an impact evaluation of the ESA Program. To this end, the primary objective for the impact evaluation is to estimate first-year gas and electric energy savings, and coincident peak demand reduction attributable to the PY2011 ESA Program. The RFP issued for this study specifically directed that the energy impact estimates be provided in the following manner:

- In aggregate;
- By IOU service area;
- By average participant household;
- By measure and/or measure group; and
- Where possible and appropriate, by climate zone and housing type (multifamily, single family and mobile homes).

In addition to providing impact results, additional research goals were developed as part of the study's Final Research Plan to address issues that arose during the two prior impact evaluations of the ESA Program (covering PY2005 and PY2009), some of which were discussed as part of CPUC A.11-05-017 et al. Specific issues addressed in the current evaluation include the following:

1. **Data Screening.** For the PY2009 impact evaluation, data screens were used to remove those observations that represented either erroneous data entries or abnormally high usage points that would bias the billing model results. Although some data screening is necessary to estimate a billing model, concern was raised during the previous evaluation that the data screening process excluded too many high usage customers, and, had these observations been retained, ESA Program impacts would have increased substantially.[4] The issue was addressed in the PY2009 evaluation by re-estimating the billing regression model with less stringent

[4] See comments filed June 17, 2011 on the draft PY2009 impact evaluation by the CPUC Department of Ratepayer Advocates (DRA), The East Los Angeles Community Union (TELACU) and other community based organizations at http://docs.cpuc.ca.gov/efile/P/138446.pdf.

screens, and these results were reported to CPUC Energy Division and the IOUs in a memo and included as an appendix in the final PY2009 impact evaluation report.[5]

As discussed below, the PY2011 ESA Program impact evaluation uses a less stringent data screening process that only eliminates a small number of outlier observations.

2. **Savings estimates over time.** An important finding from the last several evaluations of the ESA Program is that savings tend to fluctuate over time. The fact that there are valid reasons why estimates might vary from year to year needs to be communicated better in the evaluation reports, and the reasons for these fluctuations better understood. The distribution of measures across customer usage groups and weather zones in a given year will change average savings levels, for example. This issue was explored in the PY2009 evaluation by examining changes in participation across usage categories and weather zones, and using information from phone surveys and on-sites. In the current evaluation, we provide a comparison of PY2011 impact estimates to the results from prior program year evaluations, as well as comparisons with both the *ex ante* and DEER savings values. Possible reasons for discrepancies across these sources are also discussed.

3. **Weather zones.** The PY2009 evaluation found that ESA participation had shifted to more moderate climate zones for some of the large weather-dependent measures. This led to lower impact estimates for these measures and resulted in a recommendation to focus ESA Program installation for these measures in the harsher climate zones. In the current evaluation, we continue to examine weather effects by analyzing how weather-normalized energy consumption changes between the pre-participation and post-installation periods for PY2011.

4. **Survey results.** The PY2009 impact evaluation included extensive phone survey and on-site data collection efforts, which provided some important insights into how customers use energy and the measures installed through the ESA Program. For instance, the surveys revealed that 34 percent of customers were not operating their evaporative coolers properly,[6] which helped explain why the impact estimates were lower than expected in the billing regression. For the current evaluation, a smaller and more targeted participant phone survey effort was conducted. The survey sample targeted customers who saw an increase in energy use after participating in the ESA Program, and questions explored possible reasons for the increase.

A Research Plan that addresses these issues was developed at the beginning of the PY2011 ESA Program Impact Evaluation. A Draft Research Plan was first posted on the CPUC website and a public workshop was held in San Francisco to present the plan and answer questions. Once the comment period ended, the plan was revised to address comments and a Final Research Plan was posted to the CPUC Energy Division website[7] on March 18, 2013.

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[5] See Appendix E of *Impact Evaluation of the 2009 Low-Income Energy Efficiency Program*. Prepared for SCE and the CPUC by ECONorthwest (June 16, 2011), available on www.calmac.org.
[6] *Impact Evaluation of the 2009 Low-Income Energy Efficiency Program*. Prepared for SCE and the CPUC by ECONorthwest (June 16, 2011), p. 34.
[7] http://www.energydataweb.com/cpuc/home.aspx

Analysis Methods

There are two primary analysis components of this impact evaluation:

1. A fixed effects billing regression model was used to develop energy savings estimates (both kWh and therms) at the measure level for each IOU. The billing regression model relied on detailed information regarding which measures were installed through the ESA Program, combined with weather data and monthly energy consumption for both gas and electricity. All of this information was supplied to the evaluation team by the IOUs.

2. A phone survey was conducted on a sample of 602 participants that exhibited an increase in usage in the period directly after program participation. The goal of this survey was to collect information on customer behavior that would help illuminate why energy use was increasing.

Details on both of these evaluation components (and related analysis tasks) are included in the main body of this report.

Evaluation Results

The results of the regression models are used to calculate impacts for each measure group by IOU, house type and (where possible) climate zone.

Energy savings values were assigned to a measure group from the billing regression models using the following algorithm:

1. If the 95 percent confidence interval of the impact estimate from the Basic Model included the *ex ante* savings value, then the estimate from the Basic Model was used.
2. If the confidence interval for Basic Model estimate did not include the *ex ante* value, then evaluator judgment was used to assign an impact value from among the Basic Model, Measure Model, or *ex ante* values.
3. In a couple of instances, an engineering estimate was assigned when the *ex ante* values appeared to be unusually high and neither of the regression models could provide a reasonable result.

The impact estimates using these assignments are discussed below by fuel type. In most cases, the impact estimate from the Basic Model was used whenever possible.

Electric Impact Estimates

Table ES-1, Table ES-2, and Table ES-3 show the electric impacts by measure group. For each measure, the *ex ante*, Basic Model and Measure Model estimates are provided, along with information on the impact estimates from the PY2009 ESA Program evaluation. Note that in cases where the regression models estimate zero or negative savings (e.g., an increase in usage rather than a decrease), the estimated impact has been set to zero in the table. Our engineering team reviewed those measures where the algorithm assigned the *ex ante* values to assess if the *ex ante* values appeared reasonable. In the case of the SCE values for AC Tune-up and Pool Pumps, an alternative value was calculated based on engineering estimates for these measures.

The final impact number assignment is shown in the highlighted column of each table. Using the final assigned values, the total average household savings is shown at the bottom of the table for each IOU. The far right column of the tables also shows the impact estimates from the PY2009 evaluation, both at the measure-group and household level. Note that impacts on a per unit level (rather than per household, where multiple units may be installed) are shown in the detailed impacts estimates provided in Appendix D.

Once the final savings values are assigned and the whole house savings calculated, the aggregated effect increases total household savings slightly from the PY2009 evaluation for SCE, while SDG&E and PG&E both experience decreases relative to the previous evaluation estimates.

Table ES-1: SDG&E Electric Impact Estimates (kWh)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Room AC	305	27.40	99.88	42.11	27.40	Basic Model	50
Central AC	30	N/A	N/A	38.66	38.66	*Ex ante*	50
AC Tune-up	59	N/A	N/A	229.13	229.13	*Ex ante*	326
CFLs	16,434	N/A	N/A	112.11	112.11	*Ex ante*	93
Ducts	937	55.72	1.36	0.00	55.72	Basic Model	-
Clothes Washer	1,667	123.05	86.94	528.57	123.05	Basic Model	788
Hardwired lighting	6,623	34.61	0.00	115.05	115.05	*Ex ante*	100
Insulation	800	85.53	359.74	94.90	85.53	Basic Model	104
Lighting	20,825	36.99	30.35	60.48	36.99	Basic Model	346
Microwave	1,852	0.00	66.52	175.91	66.52	Measure Model	-
Refrigerator	1,808	640.42	399.40	722.11	640.42	Basic Model	697
HW Conservation	1,334	85.19	60.30	172.03	172.03	*Ex ante*	24
WH Repair/Replace	5	0.00	0.00	0.00	0.00	*Ex ante*	-
Weatherization	16,703	0.00	0.00	49.59	49.59	*Ex ante*	63
Average household savings		**119.71**	**92.92**	**346.35**	**278.57**		**303**

Table ES-2: PG&E Electric Impacts (kWh)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Central AC	79	141.04	116.53	317.35	141.04	Basic Model	50
AC Tune-up	12,143	0.00	0.00	230.04	230.04	*Ex ante*	326
CFLs	99,402	0.00	0.00	75.29	75.29	*Ex ante*	--
Ducts	3,007	112.26	10.59	94.33	112.26	Basic Model	--
Evaporative Cooler	5,841	0.00	0.00	262.15	262.15	*Ex ante*	502
Hardwired lighting	87,276	1.85	0.00	145.74	145.74	*Ex ante*	100
Insulation	6,290	145.41	0.00	46.69	145.41	Basic Model	104
Lighting	26,414	0.75	0.00	140.47	140.47	*Ex ante*	346
Refrigerator	16,773	655.36	427.92	766.89	655.36	Basic Model	697
HW Conservation	11	0.00	0.00	273.30	273.30	*Ex ante*	24
Weatherization	64,837	3.51	0.00	9.99	3.51	Basic Model	63
Room AC	3,175	0.00	0.00	111.56	111.56	*Ex Ante*	50
Average household savings		**113.11**	**64.47**	**381.46**	**366.90**		**402**

Table ES-3: SCE Impact Estimates (kWh)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Room AC	927	0.00	57.51	69.47	57.51	Measure Model	50
Central AC	4,869	309.18	160.69	150.41	160.69	Measure Model	-
AC Tune-up	32	0.00	0.00	1265.00	257.00	Engineering Est.	326
CFL	67,872	71.25	82.25	25.44	71.25	Basic Model	93
Central Heat Pumps (CHP)	137	N/A	N/A	695.24	695.24	*Ex ante*	-
Ducts	4,490	0.00	20.65	0.00	20.65	Measure Model	-
Evaporative Cooler	15,928	239.16	448.48	481.87	448.48	Measure Model	502
Evaporative Cooler Tune-up	9	N/A	8236.20	37.13	37.13	*Ex ante*	-
Lighting	3,390	38.73	145.09	161.33	145.09	Measure Model	346
Pool Pump	1,908	0.00	0.00	1686.00	1088.00	Engineering Est.	-
Refrigerator	16,714	773.99	768.14	704.03	773.99	Basic Model	697
HW Conservation	505	720.97	1255.32	83.00	83.00	*Ex ante*	24
Weatherization	722	0.00	0.00	51.14	51.14	Ex ante	63
Average household savings		**230.31**	**270.46**	**253.38**	**279.26**		**247**

Gas Impact Estimates

The gas impact estimates are shown in Table ES-4, Table ES-5 and Table ES-6, and use the same savings assignment algorithm discussed above for the electric measures. Note that in cases where the Basic or Measure Model resulted in negative savings (an increase in usage), a savings value of zero is assigned to that measure for that model. At the household level, average household savings increased substantially for all three utilities relative to the PY2009 evaluation.

Table ES-4: SDG&E Gas Savings (therms)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Ducts	930	14.54	13.48	0.00	14.54	Basic Model	-
Furnace Repair/Replace	3,666	0.00	0.00	0.00	0.00	*Ex Ante*	-
Furnace Clean & Tune	6,551	9.81	4.02	0.00	9.81	Basic Model	
Clothes Washer	1,585	15.88	14.42	35.88	15.88	Basic Model	-
Insulation	732	26.66	5.35	9.17	26.66	Basic Model	10
Pilot Light Change Out	985	15.10	18.50	11.85	15.10	Basic Model	-
HW Conservation	11,125	0.00	0.00	15.49	15.49	*Ex ante*	7
WH Repair/Replace	1,236	6.80	0.00	0.00	6.80	Basic Model	-
Weatherization	9,113	3.24	0.85	5.01	3.24	Basic Model	4
Average household savings		**13.14**	**6.87**	**21.99**	**26.06**		**8**

Table ES-5: PG&E Gas Savings (therms)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Ducts	3,578	17.17	12.10	32.75	17.17	Basic Model	0
Furnace Repair	2,197	0.00	0.00	3.21	3.21	*Ex ante*	0
Furnace Replace	1,218	0.00	0.00	3.31	3.31	*Ex ante*	0
Insulation	7,165	44.50	22.13	61.05	44.50	Basic Model	10
HW Conservation	80,871	0.00	0.00	13.92	13.92	*Ex ante*	7
WH Repair/Replace	1,326	5.58	0.00	11.68	5.58	Basic Model	0
Weatherization	69,656	0.00	0.00	9.46	9.46	*Ex ante*	4
Average household savings		**3.82**	**1.99**	**23.29**	**21.50**		**9**

Table ES-6: SoCal Gas Savings (therms)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Ducts	2,629	15.37	0.00	0.00	15.37	Basic Model	-
Furnace Repair/Replace	15,644	0.00	0.00	0.00	0.00	*Ex ante*	-
Furnace Clean & Tune	20,016	5.65	15.55	2.70	5.65	Basic Model	-
Clothes Washer	4,648	30.88	30.96	27.30	30.88	Basic Model	-
Insulation	8,225	26.51	17.49	7.76	26.51	Basic Model	10
Pilot Light Conversion	109	N/A	N/A	44.31	44.31	Ex ante	
HW Conservation	113,312	3.31	5.43	7.00	5.43	Measure Model	7
WH Repair/Replace	1,812	3.52	1.30	0.00	3.52	Basic Model	-
Weatherization	108,402	3.98	2.74	4.00	3.98	Basic Model	4
Average household savings		**11.31**	**12.90**	**12.58**	**13.40**		**11**

Impact Results Discussion

Despite the variation in impact estimates across program years and utilities, the current evaluation impact estimates are relatively close to the original *ex ante* values. Table ES-7 shows the realization rates at the household level, which is simply the estimated household savings using the current evaluation estimates divided by the estimated *ex ante* household savings. With the exception of the SDG&E electric measures, in general the evaluation estimates are reasonably consistent with the *ex ante* values. The realization rate metric is somewhat misleading in this application, however, as some of the evaluation assigned values were in fact the *ex ante* values, which move the realization rate closer to 1.0. Therefore, the realization rate as calculated here should not be interpreted as a confirmation of the *ex ante* values, as several of the *ex ante* values are used in the calculation. Nevertheless, the realization rate metric does show that the savings values recommended by the evaluation team are fairly close to the original savings estimates provided by the IOUs.

Table ES-7: ESA Impact Evaluation Realization Rates

	Evaluation Savings	*Ex Ante* Savings	Realization Rate
Electricity (kWh)			
SDG&E	278.57	346.35	0.80
PG&E	366.90	381.46	0.96
SCE	279.26	253.38	1.10
Gas (therms)			
SDG&E	26.06	21.99	1.19
PG&E	21.50	23.29	0.92
SoCal Gas	13.40	12.58	1.07

While there is some consistency with current evaluation savings estimates and the *ex ante* values at the household level, there are some obvious differences in savings estimates for individual measures. The electric impact models provide a range of savings estimates – some of which have internal consistency while other measures show significant variation across utilities, previous evaluation results, and individual *ex ante* values. While we attempted to explore reasons for these differences, it was not possible with the current budget and timeline to explore in-depth all the possible reasons for variations across models, utilities, and the results from the previous evaluation.

It is also important to note that – as discussed in the previous impact evaluation – there are legitimate reasons for savings numbers to vary both across time and utilities. In particular, with regard to comparing evaluation estimates across time, one must not conclude from these differences that one set of estimates is 'correct' or 'more accurate' than the other; the estimates may be equally accurate but reflect different baseline, program, or market conditions inherent in the different evaluation periods.

Table ES-8 shows the current PY2011 impact estimates compared with the whole house savings estimates from prior evaluation years. Since 2000, there has been a wide range of savings estimates for both gas and electricity at the household level. For electricity, the current impact estimates are lower than those from PY2009 and PY2005, but in line with estimates from PY2000 thru PY2002. For gas, the current impact estimates are significantly higher than those from PY2009 and generally consistent with impacts from earlier evaluations.

Table ES-8: Impact Estimate Comparison with Prior Evaluations

	PY2011 Evaluation	PY2009 Evaluation	PY2005 Evaluation	PY2002 Evaluation	PY2001 Evaluation	PY2000 Evaluation
Electric Savings (kWh)						
PG&E	367	402	433	399	236	240
SCE	279	247	435	286	203	153
SDG&E	279	303	342	370	215	89
Gas Savings (therms)						
PG&E	21	9	19	9	18	28
SDG&E	26	8	14	4	13	13
SoCal Gas	13	11	17	17	20	26

There are a multitude of factors that can result in different levels of savings across program years and utilities, and some of the more prevalent influences are discussed below.

Energy consumption. Households that use more energy may have the potential for greater energy savings, depending on what end uses are driving energy consumption. Differences in household energy use across both utilities and evaluation periods may account for some of the differences observed in the estimated energy savings. Additionally, it is not just the levels of energy use that are important, but also the degree to which energy consumption changes between pre-participation and post-participation periods. Changes in energy use between these two periods (and the degree to which this inter-period change differs from changes in other utilities and time periods) will also result in different impact estimates.

Household composition and home characteristics. One of the most important factors determining energy use is the number of occupants within a home. Those households with more people typically use more energy (all else equal). Similarly, differences in the household structures themselves will lead to differences in energy impacts. Homes with larger or older structures will likely have a greater potential for energy savings, as will homes in disrepair (requiring more energy to heat and cool) or older appliances (requiring more energy to run).

Weather. Weather has an important influence on energy savings, particularly for those measures where energy use and savings will vary with changes in temperature. In the current evaluation, weather is incorporated directly into the savings calculations for those measures where we can reasonably expect savings to vary with changes in temperature. The discussion later in this report illustrates how weather has changed between the current and prior evaluations, both in terms in the amount of heating degree and cooling degree days, as well as the distribution of participants across climate zones. Also note that – while the climate zones have been defined to have similar weather within each zone – there is still often significant variation in temperatures within a climate zone, particularly for those zones that include the hottest and coldest areas.

Measure mix. The amount of total household savings will vary by the types and quantity of measures installed. This is important to remember when considering that many of the savings estimates from the regression models are for groups of measures, such as weatherization and hot water conservation. While these are by necessity modeled as a single group in the regression (to mitigate the estimation problems associated with collinearity), customers may have different amounts of individual measure components installed within each measure group. These differences in measure group composition will lead to differences in savings estimates across utilities and across evaluations.

Different estimation methods. For the current evaluation, we have used the same model specification and data screening process for each utility, so different analysis methods will not explain differences in the current estimates across utilities. The current models, however, are different than what were used in the previous two impact evaluations (PY2009 and PY2005), which in turn were different than the models used in the earlier evaluations (PY2000, PY2001, PY2002). We attempted to develop impact estimates in the current evaluation using the same model specification from the 2009 evaluation, but this was abandoned due to high collinearity issues and because many of the measure-level impact estimates were showing either no energy savings or increased energy use. While we believe that the current models are an improvement over earlier evaluations, the different specifications will result in different energy savings estimates.

Savings small relative to overall energy consumption. For many of the measures installed in the ESA program, the amount of savings expected is small relative to overall household consumption. This is particularly true for some of the most common measures such as CFLs, lighting, weatherization, and hot water conservation. Given the small amount of savings, it is challenging to develop rigorous estimates that are consistent across utilities and evaluations from prior years – even when the exact same model specifications are used. The small amount of savings involved, combined with a lack of information on other influencing factors (discussed above) can result in the ESA savings being overwhelmed in the regression model by these other forces.

Conclusions and Recommendations

General conclusions that can be drawn from the impact analysis results include the following.

Savings from the ESA Program measures is a small fraction of overall household energy consumption. Savings from the ESA program on average ranges from three to nine percent of overall energy consumption. This low level of savings makes developing savings estimates (particularly at the measure level) particularly challenging. These challenges are compounded by the wide array of external factors that can influence energy use. As discussed throughout the report, the small amount of program savings is sometimes overwhelmed by these other non-program factors in the billing regression and result in estimates of no savings or increased energy use for some measures.

The final impact estimates are generally consistent with the *ex ante* savings values. The final recommended impact values for both electric and gas measures resulted in total household savings that were fairly close to the original *ex ante* savings values. For electricity, household realization rates ranged from 80 to 110 percent of *ex ante* savings. For gas, realization rates ranged from 92 to 119 percent. Note that this consistency with the *ex ante* values is due in part to how the final impact numbers were assigned from either the regression models or *ex ante* values. Since the *ex ante* values were used as the final impact estimates in cases where the regression models did not produce a reliable estimate, the potential for differences with the *ex ante* values was naturally reduced.

The impact estimates deviate from the previous evaluation and from DEER values. For electric measures, estimated savings in the current evaluation are lower than estimates from PY2009, while gas estimates in the current evaluation are significantly higher. In the case of the gas savings, this may be due to significantly more heating degree days in the current evaluation relative to the last. The current impact estimates are within the range of those observed in previous evaluations going back to 2001, however, as there is substantial variation in household savings estimates over the years. The current evaluation estimates were also different from DEER values for the same measures, although no trend of being consistently higher or lower than DEER at the measure level was observed.

Impact estimates will naturally vary across years due to a variety of factors. Differences across customer groups in terms of energy use, geographic location, measure mix, demographics, economic situation, and condition of the home will all lead to differences in impact estimates for the ESA Program. We should not expect these estimates to be the same across time or across service territories due to the large number of potential influencing factors. In the current evaluation, differences from the prior evaluation may also be due to the utilization of a different regression model and data screening process. While identifying these influencing factors is straightforward, determining the relative importance of each of these factors on the change in savings values between years is not possible without significantly more evaluation resources being devoted to making a

detailed comparison of participation patterns between years. Given that the primary objective of this impact evaluation is to develop impact estimates for the current program year, a more detailed analysis was not attempted beyond the comparisons presented earlier in this report.

A significant number of ESA participant households are using more energy after participation. Despite the new measures and energy education received through the program, a significant number of households were found to be consuming more energy after participation. For electricity, more than half all of all participants exhibited weather-normalized increases in energy use during either heating or cooling periods. Similarly, approximately 60 percent of gas participants increased their gas consumption in the post-participation period. Because this increase appears to be independent of weather, it is especially challenging to address in the billing regression and may lead to biased impact estimates. The phone survey did not provide any additional information as to what might be causing this increase in energy use. Since the vast majority of participants were already on the CARE rate prior to ESA enrollment, it is unlikely that the lower CARE rate is a factor in increased energy use for the time period examined.

Whole house impacts estimated from the household-level regression models produced lower estimates. The results from the Whole House fixed effects models that estimate total savings (rather than savings for individual measures) produced generally lower house-level savings values than simply aggregating up the measure-level savings from the Basic and Measure Models. This is due in part to the ability with the Basic/Measure models to remove impact estimates showing an increase in energy use and replacing them with the *ex ante* values, which by definition will increase the overall savings estimate. Since measure-level detail is not available in the Whole House model, it is not possible to make these types of post-model adjustments.

While it was hoped that having a whole house variable for savings would help address the possibility of collinearity among the measure variables, this advantage appears to have been outweighed by a lower ability to disentangle the program effects from other factors influencing energy consumption. This is particularly challenging given the number of homes observed to have an increase in energy use in the post-participation period (particularly with PG&E). Given this context, it is not surprising that the Whole House model (which utilizes less program information) produces lower savings estimates than the Basic Model that utilizes more information on what was installed through the program.

Customers may be unaware that they are using more energy. The phone survey targeting households with increased energy use did not provide any clear answers on what might be driving the higher consumption. Respondents generally reported that they were using their heating and cooling systems about the same as they did prior to participation. For those that said they used the systems more, the most common reason for using heating and cooling systems more had to do with changes in weather (e.g., hotter or cooler weather). As shown in the analysis of weather-normalized energy use, changes in weather are not sufficient to explain all of the increase in usage. Other factors, such as having more people home during the day, did not appear to be a significant factor in explaining increased use. While participants have been adding new appliances to their homes, these appear mostly to be replacing older units and therefore should be using less energy. These findings raise the possibility that – despite the new measures and energy education – consumers are using more energy and (perhaps more importantly) they are unaware that they are consuming more energy. The issue of whether they were truly unaware was not explored directly in the phone survey, however.

From the evaluation conclusions, we offer the following recommendations for the ESA Program.

Continue using billing regression to estimate program impacts. Despite some of the challenges discussed in this report, we recommend that the fixed effects billing regression model continue to be used to estimate impacts for the ESA Program using data from the participant population. The fixed effects model provides a means for producing statistically reliable and unbiased estimates of savings that account for both differences across households and time periods.

For future impact evaluations utilizing a billing regression, developing multiple model specifications provides more flexibility. If billing regression is to be used in future ESA Program evaluations, we recommend an approach that combines results from the Basic and Measure Model specifications presented here. While this does rely on evaluator judgment to make some impact assignments, the approach is ultimately more flexible than relying on the results of a single model. In the current evaluation, having multiple models resulted in impact estimates for some measures that could not have been provided using the Basic Model alone.

If variations in impact estimates over time are not acceptable, consider using DEER deemed values to estimate savings. The wide swings in savings estimates – both across utilities and evaluation time periods – has raised concern among some reviewers. Possible reasons for these discrepancies have been discussed in the last two impact evaluations, and variations will continue in the future. It is also stressed again here that the exact cause of these differences will likely remain unknowable without an enormous data collection effort that collects statistically representative data on home and customer demographics within each utility service territory by housing type, climate zone, and possibly additional household characteristics such as family size and home vintage. Short of a massive data collection effort, the root causes of energy savings variation across utilities and program years will likely remain unknowable.

As argued in this report, we do not believe that the variation in savings estimates is necessarily a bad thing. Nevertheless, if more consistency in the impact estimates is desired, then using deemed savings values from DEER in place of a billing regression should be considered. This deemed approach will reduce uncertainty with respect to savings estimates across utilities within a program year, as well as produce more stable savings estimates across program years. Using DEER, however, does not allow for the possibility that the low-income population is significantly different in terms of energy savings relative to the general population. While testing this theory is beyond the scope of this project, it may be worth reducing the uncertainty in savings estimates by using DEER even if that database is not an entirely accurate representation of the savings achieved in the low-income sector.

Weather variables should be calculated using hourly (rather than daily) temperature data. The calculations of CDD and HDD using hourly temperature data allow for a more accurate representation of days that heating or cooling equipment might be used. In this evaluation, the hourly method resulted in significantly more cooling degree days and only slightly more heating degree days then the traditional daily method. Given that the hourly method is more accurate and easy to calculate, we recommend that it be used for future impact evaluations of this program.

Allow more time for the impact evaluation. The time allocated for this evaluation was very short (five months), with a research plan finalized on March 1 and a final report produced by August 31. For comparison, the previous impact evaluation took 20 months. While the current impact evaluation

was completed in the time allotted, this was accomplished by having a very focused approach that did not allow for exploring additional research questions when they arose. For example, more time might have allowed for additional analysis of the survey data, or even a short follow up survey to explore other aspects of energy use that might have shed more light on increased energy consumption. Similarly, there was not enough time to conduct a more in-depth comparison of the impact estimates between the 2009 and 2011 evaluations to determine how changes in participation patterns, measure mix, and weather might have contributed to differences in impact estimates between the two years. Adding three to six months to the impact evaluation timeline would allow for a more in-depth and flexible approach that provides more insights into the ESA Program savings estimates.

Conduct a more rigorous analysis of participation patterns across evaluation years. As mentioned above, the current evaluation did not have enough time to conduct a rigorous comparison of participation patterns between PY2009 and PY2011. While this evaluation did provide some information on weather conditions and participation across climate zones between the two evaluation years, the primary focus was in developing defensible savings estimates for the current evaluation year. Additional analysis on changes in participation patterns in terms of measure mix, housing type, energy use, weather conditions, and geographic distribution would likely provide additional insights as to the factors driving the variation in savings estimates across program years. We recommend additional time and budget be allocated for this analysis in the next ESA Program impact evaluation.

Continue with current evaluation cycle timing. The last several impact evaluations have focused on a single program year and have occurred every 2-3 years, and we recommend that this cycle continue. Given that the savings levels will change regularly due to weather, measure mix, and participant characteristics, the evaluation should also be conducted at regular intervals in order to reflect this variation. This is especially important when the impact evaluation results are used to set the *ex ante* savings values for future program years. If impact evaluations are done less often, or are done for multiple evaluation years combined, then some of the inherent variability will be lost due to the timing and structure of the evaluation cycle. This may result in less accurate impact estimates moving forward, particularly if the market is shifting and the programs are locked in to using fixed impact estimates for a longer period of time until a new impact evaluation can be completed. Having the evaluations done more often (instead of every five years, as has been suggested) will provide flexibility to adjust the energy savings estimates as needed to reflect changing demographics and market conditions.

Remember lessons from previous evaluations. Finally, reviewers raised a couple of issues that relate to analysis methods that were explored in the previous impact evaluation. These are methods that were recommended by reviewers of this current report as possible methods to consider in the future:

- **Billing regression using additional survey data.** A common approach for obtaining additional customer information for use in a billing model is to conduct a phone survey of program participants that asks detailed questions about their home and factors that may have changed since participating in the program. This approach was used in the PY2009 ESA impact evaluation but did not yield useful results for the impact analysis. While in theory it might be valuable to have survey data that provide additional explanatory variables in the billing regression, in practice this did not result in an improved billing model in the PY2009 evaluation. Consequently, we do not recommend this approach for the billing regression in

future evaluations and instead recommend that the billing models rely on the ESA participant population.

- **Billing regression using on-site data.** Customer on-sites can be used to collect additional information on home characteristics that can be used as additional variables in a billing regression model. This method was also used in the PY2009 impact evaluation and did not provide credible impact estimates. The on-sites are also expensive to conduct, especially if a large enough sample is needed to be representative for a billing regression. We also do not recommend conducting on-sites in future ESA Program evaluation if their primary purpose is to collect data to support a billing regression. The on-sites may be useful for other purposes, however, such as providing additional information on baseline conditions, customer attitudes toward efficiency and energy use, whether or not installed equipment is being used properly, and other factors that affect energy consumption.
- **Billing regression using a control group of non-participants.** The PY2009 evaluation also developed a billing regression that utilized a control group of low-income non-participants, where the PY2010 participants were used as a non-participant control group for PY2009. The theory underlying this method is that the control group customers will have similar patterns of energy use as participants and therefore will control for external events such as economic conditions within the model.[8] Selecting a well-matched control group is challenging at best, however, and particularly difficult in the low-income population given the variability across program years. Using the control group did not produce useful billing regression results in the previous evaluation, and we are not optimistic that these challenges can be overcome in future evaluations without significantly more resources being devoted to identifying an appropriate control group. Despite these concerns, future evaluations may want to explore the potential benefits of using a control group if there is a way to ensure that the control group matches the participant population on key demographic variables (e.g., home type, energy use, geographic location, vintage, etc.). Exploring the use of several alternative control groups in the billing regression may also prove useful, as this was not attempted in the previous impact evaluation.

[8] The control group also helps account for free ridership in the model, which is less of a concern with the low-income population where free ridership rates are likely very low.

1 Introduction

The Energy Savings Assistance (ESA) Program provides energy efficiency measures and services at no cost to qualifying low-income customers of California's four investor-owned utilities (IOUs), Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), Southern California Gas Company (SoCal Gas), and the San Diego Gas and Electric Company (SDG&E). The ESA Program is administered by the IOUs in their respective service areas. This report presents the findings of the impact evaluation of the ESA Program for Program Year 2011 (PY2011) conducted by Evergreen Economics, CIC Research, and Michaels Energy.

1.1 Program Background

Initially established by the California Public Utilities Commission (CPUC) in the early 1980s,[9] low-income energy efficiency programs provided a channel for low-income customers to receive services similar to those provided by the energy efficiency programs instituted in response to the energy crisis of the 1970s. Subsequent legislation through the early 2000s continued to allow for the provision of energy efficiency measures to low-income customers in California.[10] Following the 2001 California energy crisis and an unanticipated increase in energy prices in 2005, the CPUC took increasingly aggressive approaches to low-income efficiency programs, expanding services and marketing activities, funding and income eligibility levels.[11]

With the 2008 adoption of the *California Long-Term Energy Efficiency Strategic Plan*[12] the approach to low-income programs again shifted. Per CPUC Decision 08-11-031[13] the PY2011 Program is intended to meet the objectives of a major new policy direction for low-income programs as set forth by the CPUC in Decision 07-12-051.[14] More specifically, these programs, in addition to promoting the quality of life of eligible customers, should serve as resource programs, designed to save energy, limit the need for new power plants, and curb greenhouse gas emissions. Low-income efficiency programs are to provide an energy resource for California, consistent with the state's established "loading order" that sets energy efficiency as its first priority, while reducing low-income customers' bills and improving their quality of life.

In D. 07-12-051, the CPUC committed to expanding low-income programs by making them available to more customers, improving their cost effectiveness and designing them in ways to make them a

[9] See CPUC D.92653, D.82-02-135, D.82-11-019 and D.82-11-086.
[10] See Pub. Util. Code § 2790, Pub. Util. Code § 382, SB 845, AB 1890, AB 1393 and SBX15
[11] See CPUC D.01-05-033, D.01-08-065, D.05-10-044, D.06-12-036 and D.06-12-038.
[12] *California Long-Term Energy Efficiency Strategic Plan*, (August 2008), available at http://www.californiaenergyefficiency.com/index.shtml
[13] CPUC, D.08-11-031 in A.08-05-022, "Decision on Large Investor-Owned Utilities' 2009-11 Low Income Energy Efficiency (LIEE) and California Alternate Rates for Energy (CARE) Applications," (November 2008), available at: http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/93648.PDF
[14] CPUC D. 07-12-051 in R.07-01-042, ""Decision Providing Direction for Low-Income Energy Efficiency Policy Objectives, Program Goals, Strategic Planning and the 2009-2011 Program Portfolio and Addressing Renter Access and Assembly Bill 2140 Implementation, " (December 2007), available at http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/77082.pdf

reliable energy resource. To achieve these objectives, it adopted a programmatic initiative to provide all eligible low-income customers the opportunity to participate in the ESA program and to offer those who wish to participate all cost-effective energy efficiency measures in their residences by 2020. The IOUs' 2009-11 ESA programs were to be treated as resource programs by focusing on energy savings, while improving the customers' quality of life. Budgets were also increased substantially in order to treat 25 percent of the overall 2020 goals within the 2009-11 program period.

Both home owners and renters may participate in the ESA Program if they have an account with an IOU offering the ESA Program and meet low-income qualifications. Eligibility for the ESA Program is determined by income-level and household-size guidelines established by the CPUC, which are updated annually to account for inflation. As indicated above, in 2005's Decision 05-10-044, the CPUC expanded the criteria for low-income program eligibility to include customers at or below 200 percent (an increase from 175 percent) of the Federal Poverty Level guidelines,[15] regardless of elderly or disability status.

Customers may also be eligible to participate in the ESA Program if they have already been enrolled in one of the following low-income programs that require income verification:

- Bureau of Indian Affairs General Assistance
- CalFresh/Supplemental Assistance Program (SNAP)
- CalWORKS/Temporary Assistance for Needy Families (TANF)
- Head Start income Eligible (Tribal Only)
- Healthy Families A&B
- Low-income Home Energy Assistance Program (LIHEAP)
- Medicated/Medi-Cal
- National School Lunch Program (NSLP)
- Supplemental Security income (SSI)
- Tribal TANF
- Women, Infants, and Children Program (WIC)

1.1.1 Program Measures

While each IOU, with approval from the CPUC, determines the specific offerings of its ESA Program, all include weather-sensitive and non-weather-sensitive measures, as well as energy education. The utilities have coordinated to offer many of the same measures, and in those areas where gas and electric service are provided by different utilities, they have aligned efforts so that one contractor provides ESA measures and services for both IOUs.[16]

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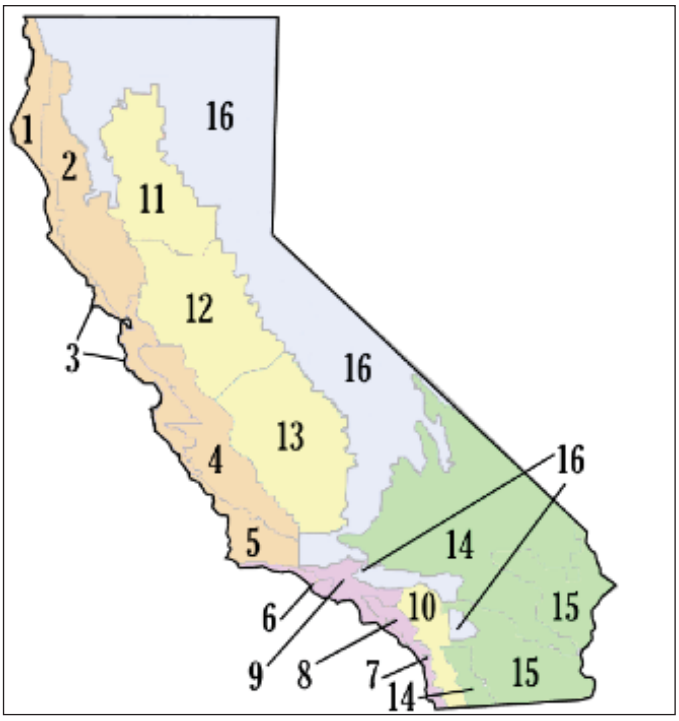
[15] These poverty guidelines are updated periodically in the Federal Register by the U.S. Department of Health and Human Services (HHS) under the authority of 42 U.S.C. 9902(2) and are available at http://aspe.hhs.gov/poverty/11poverty.shtml

[16] In areas served by different investor-owned gas and electric utilities (e.g., the SoCal Gas/SCE overlap area) the fuel source for the dwelling's space heat determines which utility will be the primary provider of weatherization services to the dwelling.

The ESA Program guidelines call for the installation of all eligible measures that are feasible. In effect, no household or measure-level cost-effectiveness criteria are applied on a per-participant basis. Non-feasibility criteria are provided in the ESA Program Policy and Procedures Manual (P&P Manual) for all measures. Generally measures are considered non-feasible when they are already present, are refused by the customer, cannot be physically installed, would create a safety hazard or violate code, or cannot meet the modified three measure rule. When necessary to complete the installation of eligible measures, contractors are also allowed to provide minor home repairs. To ensure that equipment installations are installed properly, the applicable IOU (or designated agent) provides inspection services.

Figure 1 shows a mapping of the 16 climate zones in California. The eligible measures by climate zone are included in the detailed impact tables provided in Appendix D, along with the number of each measures installed for PY2011.

Figure 1. CEC Climate Zones



1.1.2 Program Services

In addition to the equipment measures described above, the ESA Program offers information services and an energy education component. The P&P Manual provides guidelines regarding what information should be provided to low-income households during the initial home visit. In particular, the ESA Program outreach representative must provide a description of the following:

- The ESA Program, including program goals, eligibility requirements, eligible measures, and procedures. This must include energy education, available energy efficiency services and minor home repairs, general installation procedures, inspection procedures, and, if applicable, natural gas appliance testing procedures; and

- Other programs, including:
    - The existence of other separate programs designed to repair or replace furnaces or install other energy efficiency measures;
    - The California Alternate Rates for Energy (CARE) Program, along with assistance in enrolling the customer in CARE if the customer chooses to participate in it;
    - Other utility programs designed to provide services to low-income customers, including level-payment programs, medical baseline programs, and other energy efficiency programs for which the customer may be qualified; and
    - Similar programs offered by the local Department of Community Services and Development (DCSD) agencies and other known energy-related programs.

The Program's energy education component provides guidance on the following:

- General levels of energy usage associated with specific end uses and appliances;
- Impacts on energy usage of individual energy efficiency measures offered through the ESA Program or other programs offered to low-income customers by the utility;
- Practices that diminish the savings from individual energy efficiency measures, as well as the potential cost of such practices;
- Ways of decreasing usage through changes in practices;
- Information on CARE, the Medical Baseline Program, and other available programs;
- Appliance safety information;
- How to read a utility bill; and
- Procedures used to conduct natural gas appliance testing (if applicable).

The effectiveness of the ESA Program energy education component is being evaluated under a separate study and, consequently, is not addressed in the PY2011 ESA Impact Evaluation.

1.2 Evaluation Background

The PY2011 ESA Impact Evaluation is one of four low-income program studies that the CPUC directed the IOUs to undertake in Decision 12-08-044[17]. In this Decision, the CPUC directs the IOUs to conduct an impact evaluation of the ESA Program to estimate energy savings. The RFP issued for this study specifically directed that the energy impact estimates be provided in the following manner:

- In aggregate;
- By IOU service area;
- By average participant household;

[17] CPUC, D.12-08-044 in A.11-05-017 et al., "Decision on Large Investor-Owned Utilities' 2012-2014 Energy Savings Assistance (ESA) (Formerly Referred to as Low Income Energy Efficiency or LIEE) and California Alternative Rates for Energy (CARE) Application," (August 2012), available at http://www.liob.org/docs/ACF265.pdf

- By measure and/or measure group; and
- Where possible and appropriate, by climate zone and housing type (multifamily, single family and mobile homes).

In addition to this primary objective, additional research goals were developed as part of the study's Final Research Plan to address issues that arose during the two prior impact evaluations of the ESA Program (covering PY2005 and PY2009), some of which were discussed as part of CPUC A.11-05-017 et al. Specific issues addressed in the current evaluation include the following:

1. **Data Screening.** For the PY2009 impact evaluation, data screens were used to remove those observations that represented either erroneous data entries or abnormally high usage points that would bias the billing model results. Although some data screening is necessary to estimate a billing model, concern was raised during the previous evaluation that the data screening process excluded too many high usage customers, and, had these observations been retained, ESA Program impacts would have increased substantially.[18] The issue was addressed in the PY2009 evaluation by re-estimating the billing regression model with less stringent screens, and these results were reported to CPUC Energy Division and the IOUs in a memo and included as an appendix in the final PY2009 impact evaluation report.[19]

   As discussed below, the PY2011 ESA Program impact evaluation uses a less stringent data screening process that only eliminates a small number of outlier observations.

2. **Savings estimates over time.** An important finding from the last several evaluations of the ESA Program is that savings tend to fluctuate over time. The fact that there are valid reasons why estimates might vary from year to year needs to be communicated better in the evaluation reports, and the reasons for these fluctuations better understood. The distribution of measures across customer usage groups and weather zones in a given year will change average savings levels, for example. This issue was explored in the PY2009 evaluation by examining changes in participation across usage categories and weather zones, and using information from phone surveys and on-sites. In the current evaluation, we provide a comparison of PY2011 impact estimates to the results from prior program year evaluations, as well as comparisons with both the *ex ante* and DEER[20] savings values. Possible reasons for discrepancies across these sources are also discussed.

3. **Weather zones.** The PY2009 evaluation found that ESA participation had shifted to more moderate climate zones for some of the large weather-dependent measures. This led to lower impact estimates for these measures and resulted in a recommendation to focus Program

[18] See comments filed June 17, 2011 on the draft PY2009 impact evaluation by the CPUC Department of Ratepayer Advocates (DRA), The East Los Angeles Community Union (TELACU) and other community based organizations at http://docs.cpuc.ca.gov/efile/P/138446.pdf.
[19] See Appendix E of *Impact Evaluation of the 2009 Low-Income Energy Efficiency Program*. Prepared for SCE and the CPUC by ECONorthwest (June 16, 2011), available on www.calmac.org.
[20] The Database for Energy Efficient Resources (DEER) is a California Energy Commission and CPUC sponsored database designed to provide well-documented estimates of energy and peak demand savings values, measure costs, and effective useful life (EUL) all with one data source. DEER has been has been designated by the CPUC as its source for deemed and impact costs for program planning and is available at www.deeresources.com

installation for these measures in the harsher climate zones. In the current evaluation, we continue to examine weather effects by analyzing how weather-normalized energy consumption changes between the pre-participation and post-installation periods for PY2011.

4. **Survey results.** The PY2009 impact evaluation included extensive phone survey and on-site data collection efforts, which provided some important insights into how customers use energy and the measures installed through the ESA Program. For instance, the surveys revealed that 34 percent of customers were not operating their evaporative coolers properly,[21] which helped explain why the impact estimates were lower than expected in the billing regression. For the current evaluation, a smaller and more targeted participant phone survey effort was conducted. The survey sample targeted customers who saw an increase in energy use after participating in the ESA Program, and questions explored possible reasons for the increase.

A Research Plan that addresses these issues was developed at the beginning of the PY2011 ESA Program Impact Evaluation. A Draft Research Plan was first posted on the CPUC website and a public workshop was held in San Francisco to present the plan and answer questions. Once the comment period ended, the plan was revised to address comments and a Final Research Plan was posted to the CPUC Energy Division website[22] on March 18, 2013.

1.3 Organization of Report

The remainder of this report is divided into the following five chapters.

- **Chapter 2: Research Methods** describes the regression model specifications and phone survey methods.
- **Chapter 3: Model Results** presents the basic model output from the billing regression.
- **Chapter 4: Impact Estimates** discusses the impact estimates (kWh, therm and kW) derived from the billing regression model. A comparison of the impact estimates with the *ex ante* and DEER values is also provided.
- **Chapter 5: Phone Survey Results** presents selected findings from the participant phone surveys relating to how energy use changed between the pre-participation and post-participation periods.
- **Chapter 6: Conclusions and Recommendations** discusses overall conclusions and recommendations derived from the impact analysis.

Included with the main report are the following appendices:

- Appendix A: Phone Survey Instruments
- Appendix B: Complete Phone Survey Result Tabulations
- Appendix C: Detailed Regression Results
- Appendix D: Detailed Impact Tables

[21] *Impact Evaluation of the 2009 Low-Income Energy Efficiency Program*. Prepared for SCE and the CPUC by ECONorthwest (June 16, 2011), p. 34.
[22] http://www.energydataweb.com/cpuc/home.aspx

2 Research Methods

2.1 Conformity with the California Evaluation Protocols

The evaluation team designed the PY2011 ESA Program Impact Evaluation to be consistent with the *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals*, adopted by the CPUC on June 19, 2006 (Protocols).[23] The estimates of gross demand savings meet the standard for basic rigor and gross energy savings are consistent with the enhanced rigor criteria set forth therein. Adherence to the Protocols is demonstrated by the following characteristics of the analysis:

- Estimates of energy savings are primarily based on a fixed effects regression model, with twelve months of pre- and post-installation billing data.
- Factors that change over time, such as weather, were evaluated and included in the model as indicated.
- Rigorous diagnostics of the regression model were conducted, and adjustments to the model were made accordingly.

Additional components of the evaluation were designed to minimize the possibility of bias and ensure that the process and results are objective and defensible.

2.2 Regression Models

2.2.1 Basic Model Specification

The electric and gas impacts are estimated using a fixed effects billing regression model, with separate models run by IOU for each fuel type. The general specification of the fixed effects model for the electric measures is as follows:

$$KWH_{NORM_{it}} = \alpha_i + \sum_{k=1}^{K} \beta_k POST_{ikt} + \beta_2 HDD_{it} + \beta_3 CDD_{it} +$$

$$\sum_{k=1}^{K} \beta_k POST_{ikt} * HDD_{it} + \sum_{k=1}^{K} \beta_k POST_{ikt} * CDD_{it} + v_i + \epsilon_{it}$$

Where:

KWH_{NORM}= Normalized household monthly energy usage (kWh)

$POST$ = Vector of N indicator variables equal to 0 for months prior to installation of respective measure and equal to 1 for months after installation of measure

[23] *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals*. Prepared for the CPUC by the TecMarket Works Team (April 2006), available at http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/.

HDD = Total heating degree days during month

CDD = Total cooling degree days during month

i = Index for households ($i = 1,2, \ldots, I$)

t = Index for monthly time period ($t = 1,2, \ldots, T$)

k = index for measure (K different measures; k = 1, …, K)

$[\alpha, \beta_1, \ldots, \beta_K]$ = Coefficients to be estimated in the model

v, ε = Random error terms assumed to be normally distributed

A similar fixed effects model is used to estimate savings for the gas measures:

$$THERM_{NORM_{it}} = \alpha_i + \sum_{k=1}^{K} \beta_k POST_{ikt} + \beta_2 HDD_{it} + \sum_{k=1}^{K} \beta_k POST_{ikt} * HDD_{it} + v_i + \epsilon_{it}$$

Where:

$THERM_{NORM}$= Normalized household monthly gas usage (therms)

$POST$ = Vector of N indicator variables equal to 0 for months prior to installation of respective measure and equal to 1 for months after installation of measure

HDD = Total heating degree days during month

i = Index for households ($i = 1,2, \ldots, I$)

t = Index for monthly time period ($t = 1,2, \ldots, T$)

k = index for measure (K different measures; k = 1, …, K)

$[\alpha_i, \beta_1, \ldots, \beta_N]$ = Coefficients to be estimated in the model

v, ε = Random error terms assumed to be normally distributed

2.2.2 Measure Model Specification

A variation of the Basic Model, the Measure Model, was also estimated in an attempt to isolate the savings that could be attributed to each individual measure group. In particular, some measures, such as CFLs and weatherization, were installed in a high percentage of homes, leading to possible

collinearity with the other Program measures.[24] In some cases, this resulted in estimates of either no energy savings or increased energy usage associated with the measure.

To mitigate this problem, separate models were estimated for each measure group using a sample customers who only received that particular measure. If these customers had received additional measures, this information was incorporated into the Measure Model as additional explanatory variables. The additional measure variables were not used to calculate savings.

The Basic Model and Measure Model used the same model specifications and data screens, it is only the sample for each model that was changed. Detailed results for each Measure Model (by measure and utility) are provided in Appendix C.

2.2.3 Whole House Model Specification

In addition to the Basic Model and Measure Model, a Whole House Model was also estimated to develop house-level savings estimates for all measures combined. The fixed effects specification is again used to estimate the model for each household:

$$KWHNorm_{it} = \alpha_i + \beta_1 POST_{it} + \beta_2 CDD_{it} + \beta_3 HDD_{it} + \beta_4 POST_{it} * CDD_{it} + \beta_5 POST_{it} * HDD_{it} + \sum_{j=1}^{11} \beta_j MONTH_j + \epsilon_{ijt}$$

Where:

$KWHNorm$ =Normalized household monthly energy usage (KWH)

$POST$ = Indicator variable equal to 0 for months prior to ESA participation and equal to 1 for months after ESA participation

CDD = Total cooling degree days per month

HDD = Total heating degree days per month

i = Index for household ($i = 1,2, \ldots, I$)

t = Index for monthly time period ($t = 1,2, \ldots, T$)

j = Index for calendar month ($j = 1,2, \ldots, 11$), one month dropped to avoid perfect collinearity with constant term

[24] Collinearity (or multicollinearity) is a condition occurring when two or more independent variables in the same regression model contain high levels of the same information and, consequently, are strongly correlated with one another. When significant collinearity is present, the coefficient estimates of the independent variables in the regression model can be unstable, and even the signs of these coefficients estimates may change when different variables are included, making it difficult to interpret the regression coefficient estimates. In addition, standard errors may be inflated, resulting in insignificant t-statistics and incorrect conclusions regarding the statistical significance of the coefficient estimates.

$[\alpha_i, \beta_1, \ldots, \beta_5]$ = Coefficients to be estimated in the model

ε = Random error term, assumed to be normally distributed

A similar model was estimated for household gas savings. Both the electric and gas Whole House Models were estimated separately for single family, multi-family and mobile homes.

2.2.4 Additional Regression Models

A wide variety of other model specifications were explored during this evaluation in addition to the Basic and Measure Models that were finally adopted. These other models were eventually eliminated as viable options as they generally did not produce reliable or consistent results. In many cases, the alternative models produced reasonable impact estimates for only a few measures, while the remaining measures had estimates of no savings or even increased energy usage for individual measures. None of the alternative models explored provide any benefit over the Basic and Measure Model specifications.

Specific model variations that were explored are discussed below.

PY2009 impact evaluation models. The basic models from the PY2009 impact evaluation were estimated for both the gas and electric measures. The PY2009 models involved assigning customers into measure groups based on the primary measures installed as well as interacting the measure terms by energy use categories. In the current application, the PY2009 model specification resulted in high levels of collinearity in the variables, which in some cases prevented the models from being estimated at all. For many of the measures, the PY2009 model specification resulted in estimates of zero savings or increased energy use. For these reasons, the PY2009 model specifications were abandoned in favor of the Basic and Measure Models.

Data screens. To explore the potential benefit of screening some outlier observations to make the analysis dataset more homogenous in terms of energy use, the Basic, Measure and Whole House models were estimated with more stringent data screens. This included screens based on the following criteria:

- Requiring a minimum number of months of billing data (both 6 and 10 month minimums were tried)
- Eliminating households with large changes in energy use between the pre-participation and post-participation periods (increases greater than 100 percent and reductions greater than 50 percent).
- Removing observations and households with consumption more than three standard deviations from the mean for that house type
- Dropping households that had a furnace repair or replacement, as these are expected to increase in energy use in the post-participation period.

It was hoped that these screens might produce savings estimates for some measures where an increase in usage was shown in the Basic or Measure Models. That is, by screening out some of the households that might be contributing to the overall 'noise' in the analysis dataset, the measure-level savings effects might be isolated and a reasonable impact estimate obtained. Unfortunately, none of these screens resulted in consistent improvements to the measure impacts, as the

screened data models produced similar estimates to the same models without these data screens. Because there was little added benefit, these additional screens were not used for the final models.

Measure group models. In an effort to mitigate some of the collinearity problem between measures, the Basic Model was estimated with all the measures aggregated into three or four larger measure groups. By creating larger measure group categories, savings estimates for measure groups would allow the savings to be parsed out post-model by using the *ex ante* savings values to determine the share of savings attributable to each of the individual measures within a group. While in theory this approach seemed reasonable, in practice this specification resulted in erratic savings estimates across utilities, with some measure groups resulting in estimates of increased energy use. This indicates that the loss of information resulting from combining measures was not enough to overcome the collinearity problems associated with including the individual measures separately. Since each group covered multiple measures (e.g., even more measures included within a group than with the Basic Model), a positive savings value for a measure group meant that an even larger number of measures could not be assigned savings values from the regression models. For this reason, the measure group models were not used in the final impact analysis.

Logged variables. The Basic Model was estimated using a natural log transformation of the dependent variable to see if the Basic Model might fit the transformed data better and produce more reliable savings estimates. In the initial runs, this model produced similar results to the Basic Model. Since the log-transformed model has a less intuitive interpretation and did not provide any additional benefit, it was abandoned in favor of the Basic Model specification.

2.2.5 Measure Groupings

Because some measures are often installed together, individual variables representing separate installations of each measure will be highly collinear in the regression model, which results in the model being unable to attribute energy savings to the individual measures. An example of this is faucet aerators and low-flow showerheads, which are usually installed together in eligible households. It is difficult or even impossible for the model to develop reasonable estimates of savings for each of these measures since they are almost always installed simultaneously. For other individual measures with low expected savings, it is unlikely that a household-level billing regression model will be able to provide reliable savings estimates.

To address the issue of small savings and collinearity across similar measures, some individual measures were combined into a single measure group for use in the regression models in place of the individual measure variables. This approach was used in the prior two impact evaluations and we have attempted to use the same measure groupings wherever possible.

The individual measures that comprise the measure groups are shown in the following table for both gas and electric measures. More detail on the measure group assignments by IOU is included at the end of Appendix D.

Table 1: Measure Groupings Used for Billing Regressions

Measure Group for Model	IOU Measure Name
Central AC	Central AC
Central AC Tune-Up	Maintain Central AC
Central Heat Pump	Central Heat Pump
Clothes Washer	High Efficiency Clothes Washer
CFL	CFL
Ducts	Duct Test and Seal
Evaporative Cooler	Evaporative Cooler
Evaporative Cooler Tune-Up	Maintain Evaporative Cooler
Furnace Repair/Replace	Forced Air Furnace
Hard Wired Lighting	Hard Wired Lighting
Hot Water Conservation	Faucet Aerators
Hot Water Conservation	Low-Flow Showerhead
Hot Water Conservation	Shower Hardware
Hot Water Conservation	Pipe Insulation
Hot Water Conservation	Thermostatic Shower Valve
Hot Water Conservation	Water Heater Blanket
Hot Water Conservation	Water Heater Pipe Wrap
Insulation	Attic Insulation
Lighting	Light Fixture
Lighting	Occupancy Sensor
Lighting	Torchiere
Other	Attic Ventilation
Other	Microwaves
Other	FAU Stand Pilot / Change Out
Other	Programmable Control
Other	Thermostat
Pool Pump	Pool Pump
Refrigerator	Refrigerator
Room AC	Room Air Conditioner
Weatherization	Attic Access Door Installation
Weatherization	Attic Access Weather-stripping
Weatherization	Casing
Weatherization	Caulking
Weatherization	Door Assembly
Weatherization	Door Hardware
Weatherization	Door Replacement
Weatherization	Envelope & Air Sealing
Weatherization	Exhaust Fan Vent Repair
Weatherization	Evaporative Cooler Cover
Weatherization	Glass
Weatherization	Outlet Cover Plate Gaskets
Weatherization	Vent Cover
Weatherization	Wall/Floor Repair
Weatherization	Weather-stripping
Weatherization	Window Replace
Weatherization	Window Repair

2.2.6 Weather Variables

In prior evaluations of the ESA Program, the weather variables (CDD and HDD) were calculated on a daily basis using a fixed base temperature (65° F). While this is a standard approach, a potential shortcoming of this method is that using a daily (rather than hourly) value might mask some heating or cooling loads on days with large temperature swings. For example, if a day starts out cool and then warms up to the point where some air conditioners are used, there will be some cooling load and, consequently, some potential for some energy savings during the warm hours of the day. When the cool morning temperatures are combined with the warm afternoon temperatures, however, they may cancel each other out when averaging over the entire day, giving the appearance that this was not a cooling degree day when in fact some cooling did occur.

To address this issue and help ensure that all heating and cooling activity is reflected in the model, we developed HDD and CDD variables based on hourly rather than daily temperature fluctuations.

To calculate the hourly CDD and HDD variables, a dataset of hourly weather conditions recorded at various weather stations was obtained for each IOU included in our analysis.[25] Matching the hourly data to each customer billing record was accomplished using the following steps:

1. First, heating degree hours (HDH) and cooling degree hours (CDH) were calculated using a base temperature of 65° F;

2. Next, the hourly data were aggregated into a set of daily observations that included HDD and CDD. HDD and CDD were computed as the mean of twenty-four HDH and CDH observations for each day in the three-year study period;

3. Following this aggregation, the daily weather dataset was matched to the set of billing records using the weather station and billing period end date as identifiers;

4. The total HDD and total CDD corresponding to each billing record were then computed using a set of lagged, daily weather values with the lag number set equal to the number of days in the billing period,[26] This allowed us to create a custom set of HDD and CDD values for each customer record;

5. Finally, in order to weigh all observations equally in the analysis, each set of HDD and CDD values were normalized by calculating the average value of each value within the billing period (computed as total HDD/CDD divided by number of billing days) and multiplying by the average number of days in a month (30.4375).

This combination of using hourly information and customizing each set of weather values to fit the corresponding billing period allowed the evaluation team to include a more accurate representation of each customer's weather conditions in the regression models.

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[25] SCE weather data were used to assign hourly temperature data for the SoCal Gas models based on zip codes.
[26]For example, if a customer billing record was from January 1, 2010 to February 2, 2010, the weather data values for all days from February 2, 2010 back to January 1, 2010 (33 days) were summed to compute billing period HDD and CDD.

Figure 2 and Figure 3 show the difference in the weather variables for each climate zone using both the hourly and traditional daily calculations. As Figure 2 shows, the hourly method results in a greater number of cooling degree days compared to the daily average. There is also an increase in heating degree days with the hourly method, but here the increase is less pronounced. These differences had relatively little effect on the regression results when tested using the Basic Model. Nevertheless, we believe that the hourly calculation method is a more accurate representation of weather conditions and therefore should be used in future evaluations of the ESA program. Additionally, even though the effect is small in the current evaluation, larger differences may appear in future years and given the importance of weather in the regression models, these differences should be incorporated into the analysis. The hourly values are also not difficult to calculate, so the cost of incorporating them into the evaluation analysis is minimal.

Figure 2: Comparison of Hourly and Daily CDD Calculations (All IOUs Combined)

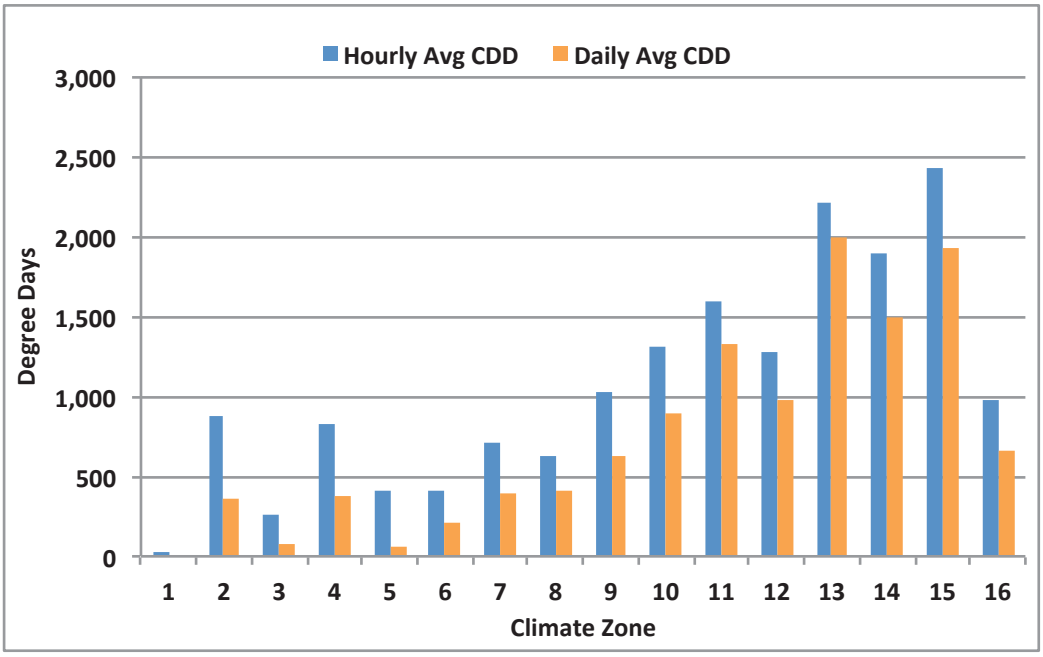
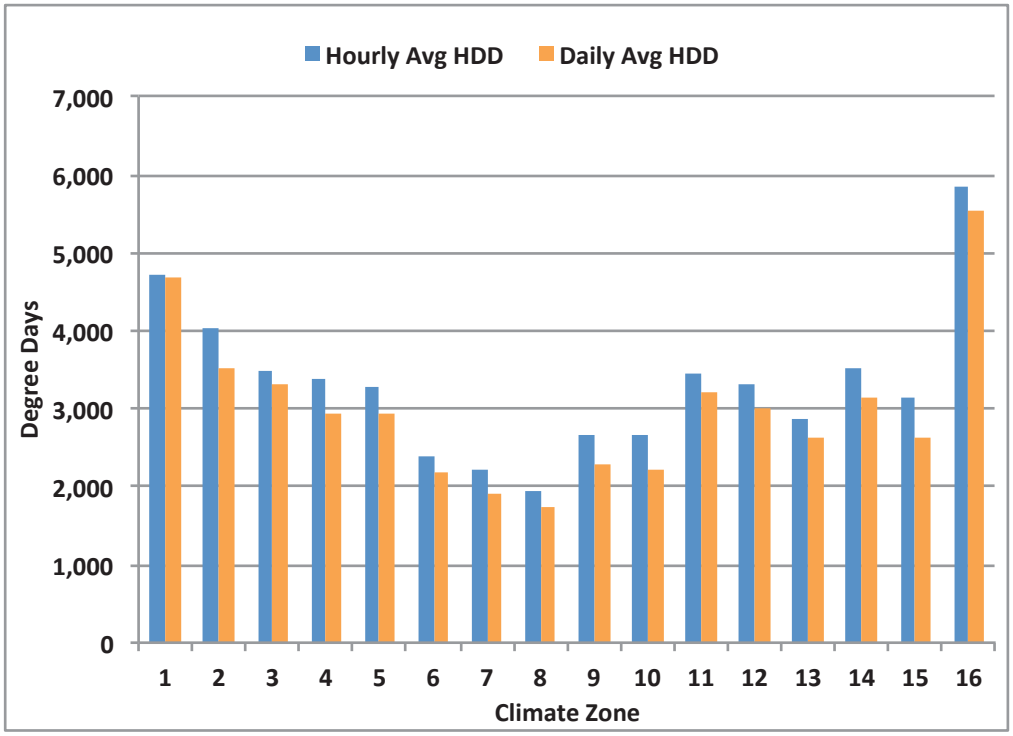


Figure 3: Comparison of Hourly and Daily HDD Calculations (All IOUs Combined)



2.3 Demand Impacts

In addition to estimating energy impacts, a separate evaluation task was to estimate demand impacts (kW) for each of the electric measures. The energy-to-demand conversion factors used in this evaluation were taken from the E3 Calculator developed for the CPUC by Energy Environment Economics, Inc.[27] The IOUs use the E3 Calculator to calculate the cost-effectiveness of energy efficiency programs, and, consequently, the kW conversion factors are used in the ESA Program impact evaluation in order to be consistent with the cost-effectiveness analyses to the extent possible.

The E3 Calculator contains a set of coincident peak conversion factors at the measure level for each IOU. An important part of this task was to match the ESA measures to those in the E3 Calculator spreadsheets as closely as possible. Where a direct match could not be made, the next most similar measure was chosen. In the event that a match could not be found for a specific measure within an IOU, the measure was assigned a conversion factor from a different utility that had the same measure. The measures where assignments were made from similar measure or utilities are displayed in Table 2.

[27] More detail on the E3 Calculator is available at the Energy Environment Economics, Inc. website at http://ethree.com/public_projects/cpuc4.php

Table 2: Coincident Peak kW Conversion Factor Indirect Matches

Utility	Measure Category	Source Value
PG&E	Insulation	PG&E; Weatherization
PG&E	Lighting	PG&E; Indoor CFL
PG&E	Room AC	PG&E; Central AC
SCE	Central AC Tune-Up	SCE; Central AC
SCE	Evap Cooler	SCE; Central AC
SCE	Evap Cooler Tune-Up	SCE; Central AC
SCE	Furnace Repair/Replace	SDG&E; Residential Space Heating
SCE	Lighting	SCE; Indoor CFL
SCE	Other	SCE; Residential Building Shell Insulation
SCE	Room AC	SCE; Central AC
SCE	Weatherization	SCE; Residential Building Shell Insulation
SDG&E	Central AC Tune-Up	SDG&E; Central AC
SDG&E	FAU Standing Pilot Light Conversion	SDG&E; Space Heating
SDG&E	Microwaves	PG&E; Residential Cooking
SDG&E	Room AC	SDG&E; Central AC
SDG&E	Weatherization	SDG&E; Duct Sealing

Once the matching was completed at the measure level, the conversion factors were averaged within each measure group to obtain a single conversion factor for each respective measure group. Ultimately, this matching procedure ensured that each measure category was assigned the most representative coincident peak conversion factor.

Once the conversion factors were determined, the demand savings were estimated directly by applying the conversion factors to the kWh impacts for each measure group for each IOU.

The demand-to-energy savings conversion factors for each measure category are shown in Table 3.

Table 3: Coincident Peak kW Conversion Factors by Measure and IOU

IOU	Measure Category	kWh-to-kW Conversion Factor
PG&E	Central AC & Tune-Up	0.00018
PG&E	CFL	0.00013
PG&E	Ducts	0.00016
PG&E	Evaporative Cooler	0.00032
PG&E	Furnace Repair/Replace	0.00005
PG&E	Hardwired Lighting	0.00013
PG&E	Insulation	0.00019
PG&E	Lighting	0.00013
PG&E	Microwaves	0.00020
PG&E	Refrigerator	0.00014
PG&E	Room AC	0.00018
PG&E	Water Heater Repair/Replace	0.00015
PG&E	Weatherization	0.00019
PG&E	Water Heating Conservation	0.00015
SCE	Central AC / Room AC & Tune-Up	0.00015
SCE	Central Heat Pump	0.00045
SCE	CFL	0.00013
SCE	Ducts	0.00016
SCE	Evaporative Cooler	0.00015
SCE	Evaporative Cooler Tune-Up	0.00015
SCE	Furnace Repair/Replace	0.00005
SCE	Insulation	0.00012
SCE	Lighting	0.00013
SCE	Other	0.00012
SCE	Pool Pump	0.00005
SCE	Refrigerator	0.00012
SCE	Room AC	0.00015
SCE	Weatherization	0.00012
SCE	Water Heating Conservation	0.00012
SDG&E	Central AC / Room AC & Tune-Up	0.00019
SDG&E	CFL	0.00012
SDG&E	Clothes Washer	0.00013
SDG&E	Ducts	0.00021
SDG&E	FAU Standing Pilot Light Conversion	0.00005
SDG&E	Furnace Repair/Replace	0.00005
SDG&E	Hardwired Lighting	0.00007
SDG&E	Insulation	0.00019
SDG&E	Lighting	0.00012
SDG&E	Microwaves	0.00020
SDG&E	Refrigerator	0.00012
SDG&E	Water Heater Repair/Replace	0.00012
SDG&E	Weatherization	0.00021
SDG&E	Water Heating Conservation	0.00012

2.4 Data Screening

To estimate the fixed effects models, several data screens were applied to remove extreme outlier observations and/or observations that were clearly data entry errors. Per the related discussion above, we kept these screens to the bare minimum and focused primarily on those that removed individual observations rather than entire households. This allowed us to retain as much usable data as possible – and significantly more than in previous evaluations.

A variety of relaxed and stricter data screens were explored, but we ultimately settled on a set that removed single observations in the billing data based on monthly energy usage. Specific screening criteria included the following:

- Removing master-metered customers where these could be easily identified;
- Removing monthly observations that had electricity consumption greater than 10,000 kWh;
- Removing monthly observations that had electricity consumption less than 100 kWh; and
- Removing monthly observations that had gas consumption greater than 5,000 therms.

The number of monthly observations and households dropped due to these screens is shown in Table 4 and Table 5. Neither SDG&E nor SoCal Gas had any observations removed from its gas account data based on the above criteria. The screen of 5,000 therms per month removed 391 observations and two households from the PG&E gas dataset, which may have been unidentified master-metered accounts.

A relatively small percentage of observations and households were removed from the electric account data. The cutoff points of 100 kWh and 10,000 kWh per month affected electric billing data for all IOUs, with SCE losing the most observations and households. However, this still amounted to less than two percent of households and less than three percent of the total monthly observations for that utility.

Table 4: Electric Model Data Screening

	Starting # of obs	# obs screened out	% obs screened out	# obs used in model	Starting # of households	# households screened out	% of households screened out	# households used in model
PG&E Electric	3,318,940	63,294	2%	3,255,646	112,565	602	1%	111,963
SDG&E Electric	610,728	17,672	3%	593,056	21,846	83	0%	21,763
SCE	3,172,228	92,468	3%	3,079,760	103,869	1,475	1%	102,394

Table 5: Gas Model Data Screening

	Starting # of obs	# obs screened out	% obs screened out	# obs used in model	Starting # of households	# households screened out	% of households screened out	# households in model
PG&E Gas	2,941,844	391	0%	2,941,453	101,568	2	0%	101,566
SDG&E Gas	378,850	0	0%	378,850	13,336	0	0%	13,336
SCG	3,652,191	0	0%	3,652,191	117,386	0	0%	117,386

An additional screen involved manually removing master-metered accounts for two primary reasons:

1. Master-metered accounts are problematic in a billing regression. The aggregation of data to the master-metered level removes much of the variation needed to develop robust impact estimates in a billing regression model.
2. The IOUs have few master-metered accounts in the ESA Program, representing only a small fraction of overall participation. For the PY2011 Program, the number of such accounts by utility are approximately:
    - PG&E: 9,728
    - SCE: 2,700
    - SCG: 670
    - SDG&E: 330

Given the difficulties in modeling this population with a billing model, the low numbers for these accounts, and limited project budget and time, these customers were excluded from the billing regression analysis in order to focus evaluation resources on areas of higher priority.

2.5 Phone Survey

As mentioned above, the phone survey of ESA Program participants fielded as part of the PY2011 ESA Impact Evaluation was a smaller and more targeted effort than in past studies. For the survey, the Research Plan called for the sample to target 600 customers, distributed evenly across IOUs, who saw an increase in energy use after participating in the ESA Program. Questions were developed to explore possible reasons for the increase. To identify which customers had an increase in usage, we normalized the pre-installation and post-installation data based on HDD and CDD. The result was a measure that identifies households that had an increase in energy use while controlling for changes in average weather conditions between the two periods (pre- and post-participation). Table 6 lists the phone survey sample sizes.

Table 6: Phone Survey Sample Sizes by IOU and CDD/HDD

Utility	HDD-based Increased Users (Top 33%)	CDD-based Increased Users (Top 33%)	Totals
PG&E	75	75	150
SCE	75	75	150
SDG&E	75	75	150
SCG	75	75	150
Totals	**300**	**300**	**600**

CIC Research fielded the survey in April 2013, completing 602 surveys. Table 7 shows the final call disposition.

Table 7: Phone Survey Call Disposition

	Number	Percentage
Live Numbers		
No Answer	500	10.9%
Answering Machine	1217	26.6%
Busy Number	28	0.6%
Callback	242	5.3%
Dead Numbers		
Respondent Never Available	15	0.3%
Number not in Service	466	10.2%
Business/Fax/Modem	42	0.9%
Refused/Mid-Term Refusal	369	8.1%
Wrong Number	224	4.9%
Spanish	589	12.9%
Other Language	84	1.8%
No Longer at That Address	57	1.2%
No Awareness of Program	63	1.4%
Did Not Participate In Program	34	0.7%
Pre-Test Interviews Deleted	47	1.0%
Completed Interviews	602	13.1%
Total	**4579**	**100.00%**

3 Regression Model Results

3.1 Participant Data Analysis

3.1.1 Participation Patterns Across Climate Zones

Prior to discussing the regression model results and savings estimates, it is useful to have a broader understanding of the ESA participant population, including participation trends and how energy consumption has changed between the pre-participation and post-participation periods. To facilitate this, Table 8 shows the number of households participating in the program for PY2011, which was used as the basis for all of the regression modeling and impact analysis.[28]

Table 8: PY2011 ESA Impact Evaluation Participation Counts

IOU	Electric Participants	Gas Participants
PG&E	112,565	101,566
SDG&E	21,846	13,336
SCE	103,869	--
SoCal Gas	--	117,386

For the common service territory covered by both SoCal Gas and SCE, a list of overlapping accounts was provided to the evaluation team by SoCal Gas. These accounts were then merged against the SCE participant and billing data to obtain a dataset with the appropriate SoCal Gas and SCE account data combined. Weather data from SCE were then also assigned to SoCal Gas customers in this manner.

The primary research question of this impact evaluation is to determine how much energy savings was achieved by the measures installed through the ESA Program. While the measures themselves will save energy, they are just one of many possible influences that affect energy use over the same period. The challenge of any impact evaluation is to isolate the measure influences and disentangle their effect from the other influencing factors.

Weather is an important driver for both energy use and potential energy savings, and examining the distribution of ESA participants can help us understand the magnitude of savings achieved. In general, if ESA participants tend to be located in the hotter or colder areas, then (all else equal) we can expect greater savings than if participants are clustered in the milder climates.

Figure 4 shows the number of cooling degree and heating degree days by climate zone for the current evaluation. While the weather data are analyzed by individual climate zone in the impact calculations, they are grouped into three climate zone categories for ease of presentation. It also allows us to

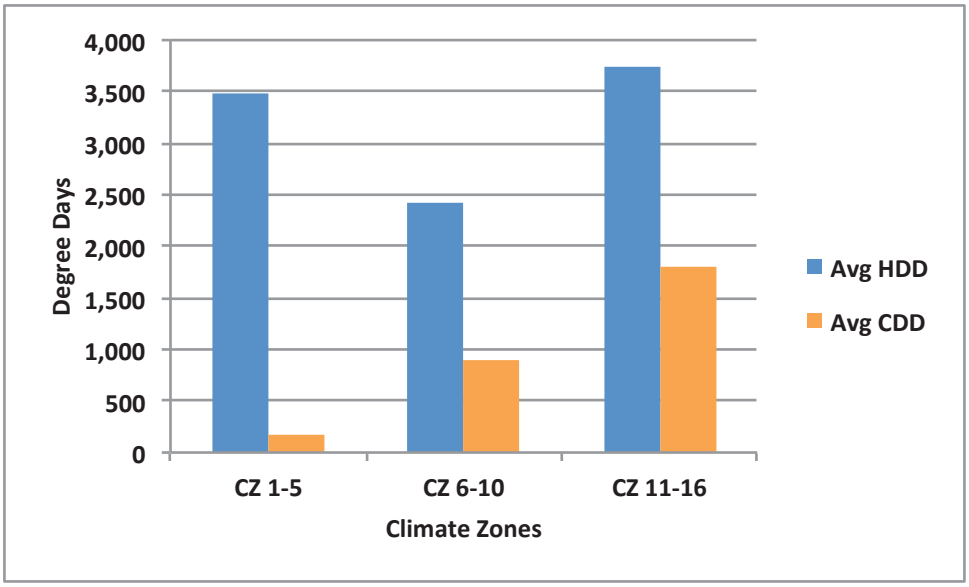
[28] Note that the participation counts are calculated based on the PY2011 ESA Program tracking data provided by the IOUs in response to a data request submitted by the evaluation team. Given that this was a separate data request exercise, there may be discrepancies between the numbers reported here and those reported in the ESA Program Annual Reports, which are compiled separately. These numbers also reflect the total number of participants that could be matched to billing data for each IOU.

present some comparisons with the previous evaluation, which utilized the same climate zone groupings.

For cooling degree days, there is a trend toward warmer weather in the higher numbered climate zones, with climate zones 1-5 having the fewest cooling degree days and climate zones 11-16 having the most over the evaluation analysis period. Other things equal, we would then expect those weather-sensitive measures (e.g., AC installations and tune ups, Room ACs, evaporative coolers) installed in the higher numbered climate zones to achieve more savings than those installed in the more moderate climate zones with fewer cooling degree days.

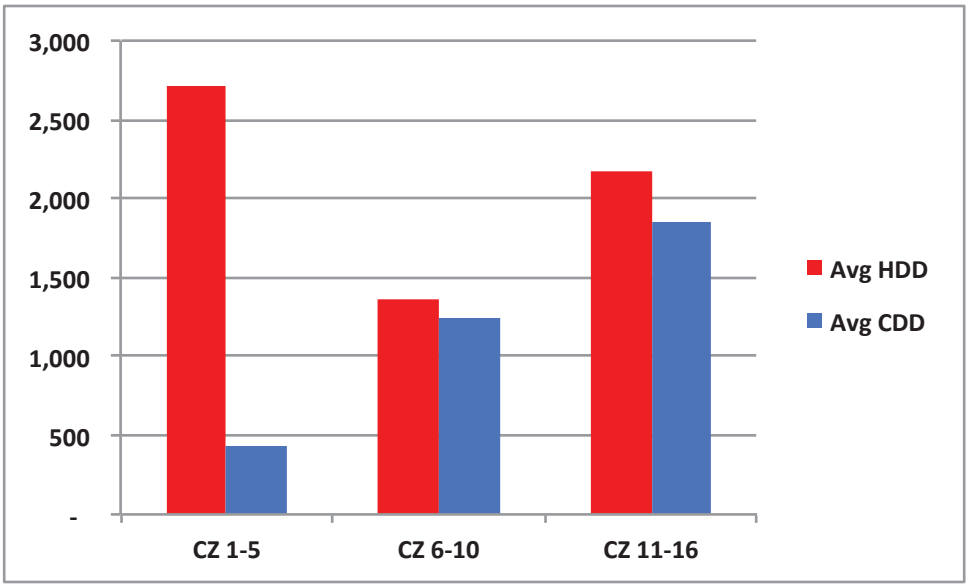
A less pronounced trend is shown for heating degree days, where more heating days are observed for climate zones 1-5 and zones 11-16 relative to the middle zones 6-10. Measures installed in those zones with higher amounts of heating degree days should result in higher levels of savings.

Figure 4: Average CDD and HDD by Climate Zone (CZ) Grouping for the Current Evaluation



For comparison, Figure 5 shows the analogous graph from the previous (PY2009) ESA impact evaluation. When comparing Figure 5 with Figure 4, we can see that the current evaluation has more heating degree days across all three of the climate zone groupings. The current evaluation also has slightly lower cooling degree days across all three of the climate zone groupings. Given the importance of weather in the impact calculations, these differences are likely a significant contributor explaining some the differences in energy impacts between the two evaluations.

Figure 5: Comparison of Weather Data from the Prior Impact Evaluation (PY2009)[29]



From the weather data alone shown in Figure 4, we would want heating-related measures to focus on the colder climate zones (zones 1-5 and 11-16) while cooling-related measures should be targeted more in climates zone 11-16. The following graphs show how well the actual PY2011 measure installations followed these weather patterns. Note, however, that there are other factors such as home owner eligibility that also determine which measures get installed in which areas, and consequently the ESA participation cannot just target areas with the most extreme weather conditions. This evaluation did not investigate the factors driving participation trends across climate zones or the reasons why these may have shifted relative to PY2009.

Finally, the following graphs show the distribution of participating households by climate zone, for both electricity and gas measures. In general, the electric customer participants are somewhat evenly distributed across climate zones, with no clear tendency toward the more extreme weather areas for either heating or cooling.

[29] *Impact Evaluation of the 2009 Low-Income Energy Efficiency Program*, p. ES-8.

Figure 6: Participating Households by Home Type and Climate Zone (Electric Measures)

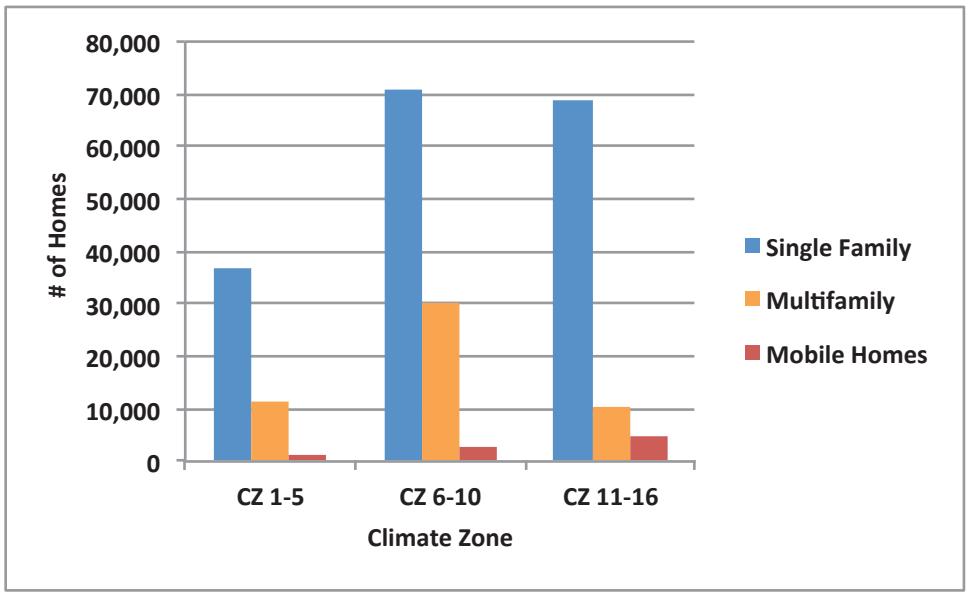
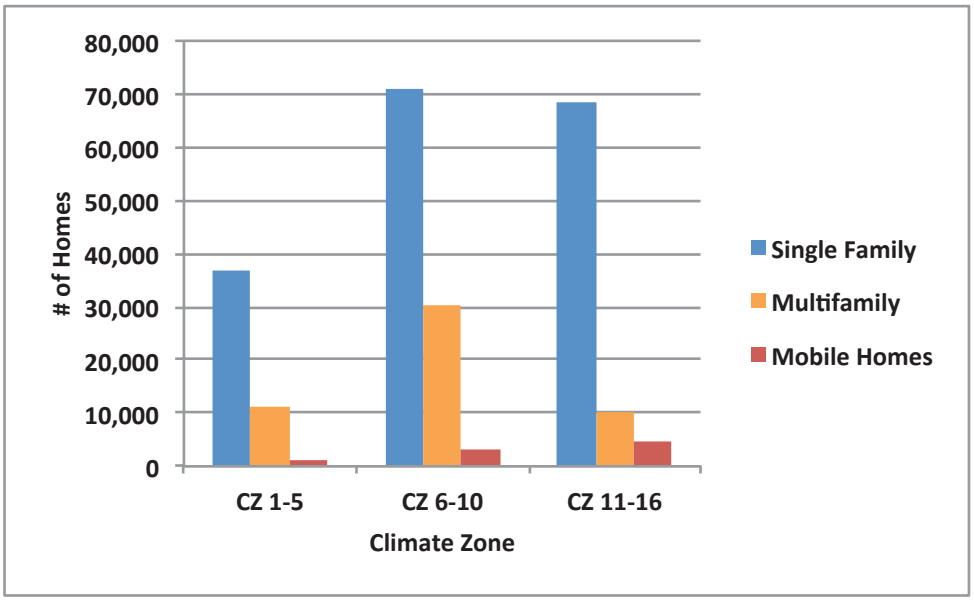


Figure 7: Participating Households by Home Type and Climate Zone (Gas Measures)



3.1.1.1 Electric Measures

Figure 8 shows the distribution of all electric measures installed in ESA PY2011 (all utilities combined). A slight majority is installed in climate zones 11-16, which also have the largest amount of both heating degree and cooling degree days.

Figure 8: Electric Measure Distribution Across Climate Zones (All Utilities)

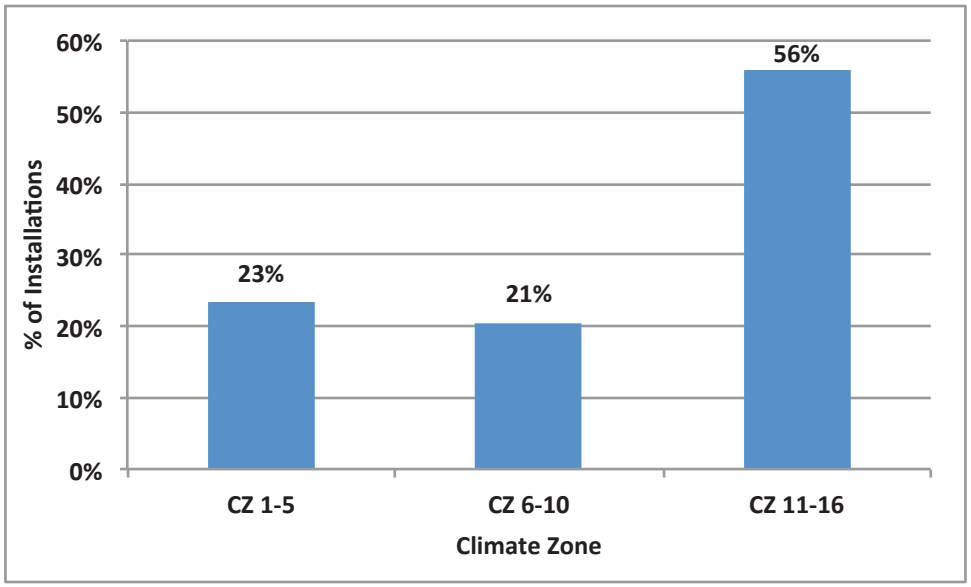


Figure 9 shows the share of installation of just cooling measures (Central AC, Room AC, AC Tune Up, Evaporative Cooler) across the same climate zones. With the cooling measures, the trend toward climate zones 11-16 even more pronounced. This trend of having more installations in the higher numbered climate zones is consistent with the trend shown earlier in Figure 4, where more cooling degree days are also occurring in the higher numbered climate zones. This indicates (at least for this program year) that the ESA cooling measure installations are being done in warmer climate zones where energy savings impacts will be greater.

Figure 9: Cooling Measure Installations Across Climate Zones (All Utilities)

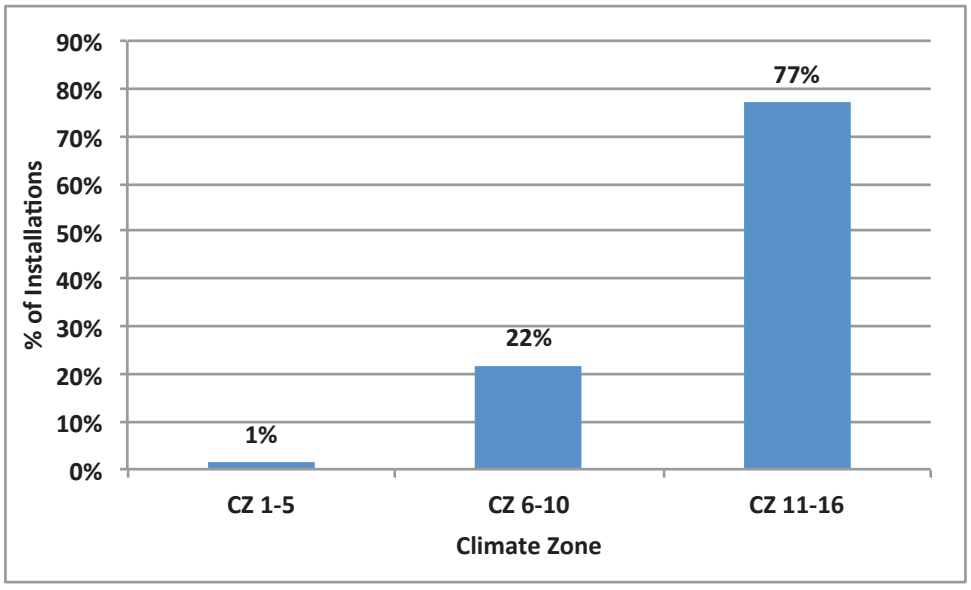
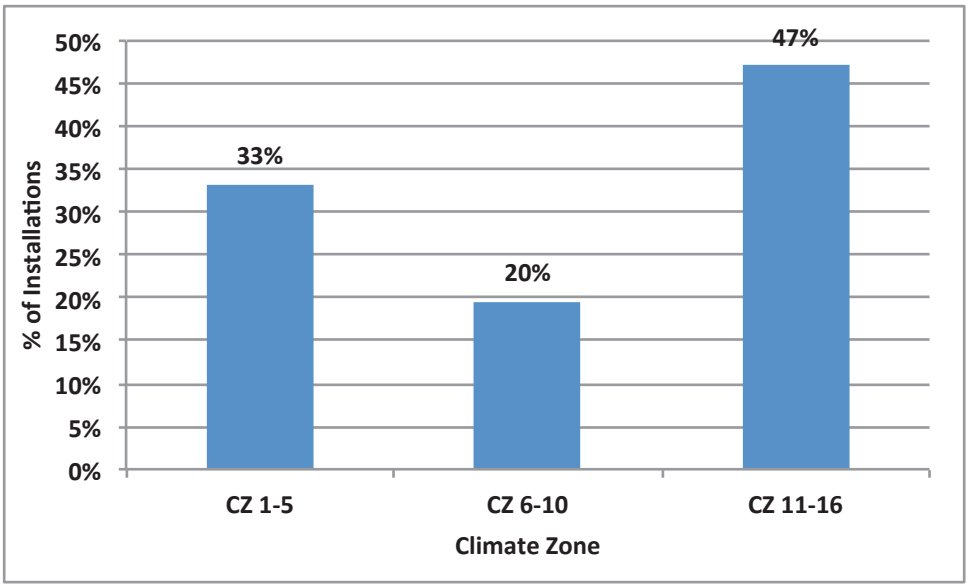


Figure 10 shows the distribution for the weatherization, insulation, and duct measures (the remaining weather-sensitive measures for electricity). Here we see a more even distribution across climate zones, with climate zones 11-16 still receiving the highest share.

Figure 10: Weatherization/Insulation/Duct Measures Across Climate Zones (All Utilities)



3.1.1.2 Gas Measures

The same analysis was conducted for the gas measures, and in this case we have the distribution from the pervious PY2009 evaluation for comparison (this comparison was not done previously for the electric measures).

Figure 11 shows the overall distribution of gas measures installations for PY2011, for all utilities combined. Recall from Figure 4 that climate zones 1-5 and 11-16 had the most heating degree days, and consequently we would like to see most of the gas measures installed in these zones to maximize the potential for energy savings. As shown in the graph below, however, the middle climate zones 6-10 are receiving the most gas measures, suggesting that the savings realized for these measures are lower than they might be if they had been installed in the other climate zones with more heating degree days.

Figure 11: Gas Measure Distribution Across Climate Zones (All Utilities)

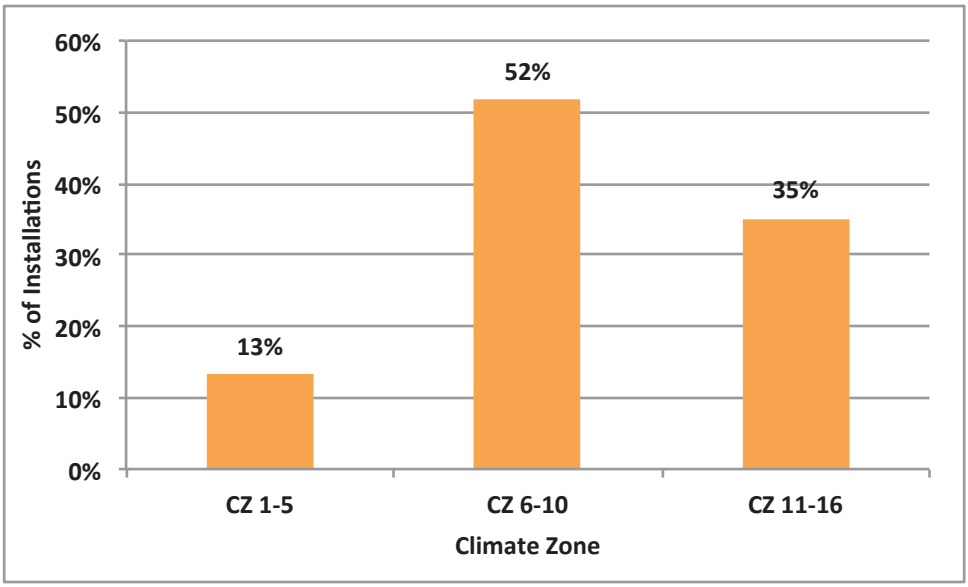


Figure 12 shows the distribution of furnace measures installed by climate for PY2011 along with the comparison with the previous evaluation of PY2009. Both years show the vast majority of installations falling in the milder 6-10 climate zones, although PY2011 is showing a shift to the cooler 11-16 climate zones. This suggests that the energy savings for these measures might be lower than they would have been had they been installed in the colder climate zones, although weather is just one of several factors determining energy savings.

Figure 12: Furnace Repair/Replacements By Climate Zone (All Utilities Combined)

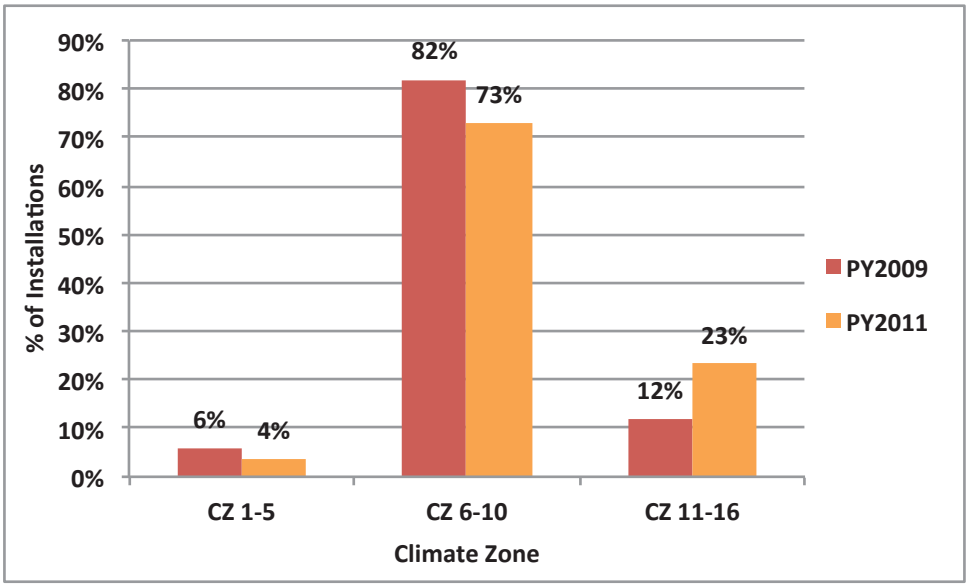
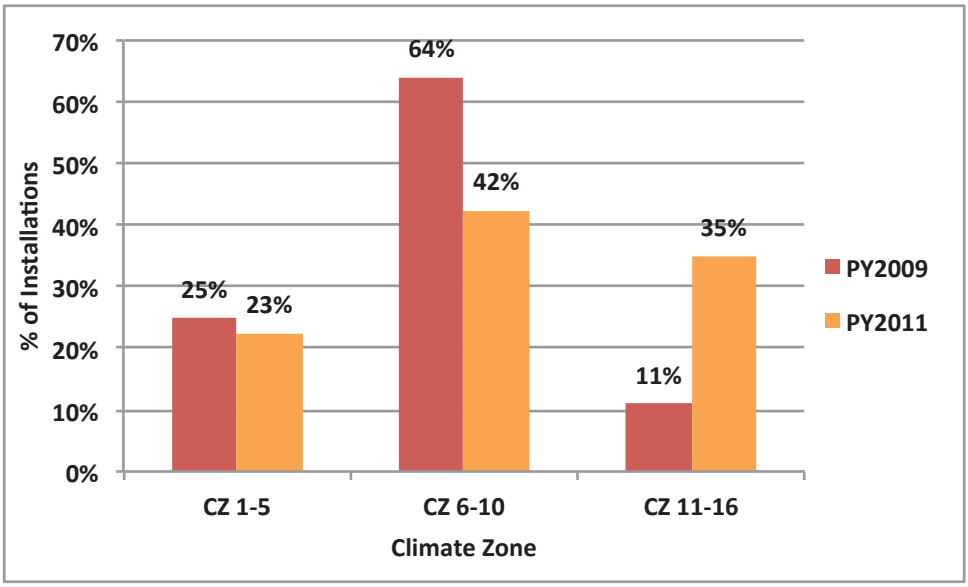


Figure 13 shows the insulation installations by climate zone. For this measure, there has been a distinct trend toward more installations in climate zone 11-16 relative to PY2009, although possible

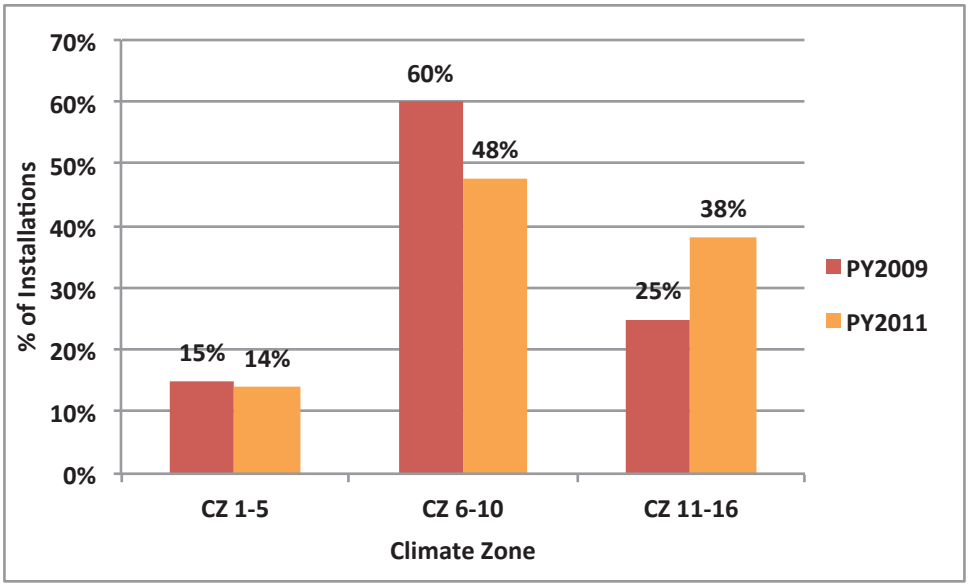
reasons for this shift were not explored as part of this evaluation. This trend toward the cooler climate zones should result in greater average savings for these gas measures (all else equal).

Figure 13: Insulation Installations By Climate Zone (All Utilities Combined)



A similar trend is observed for weatherization installations, as shown in Figure 14. For this measure, there is a marked increase in installations in climate zones 11-16 relative to the prior evaluation, which should also increase the average savings estimates for these measures.

Figure 14: Weatherization Installations By Climate Zone (All Utilities Combined)



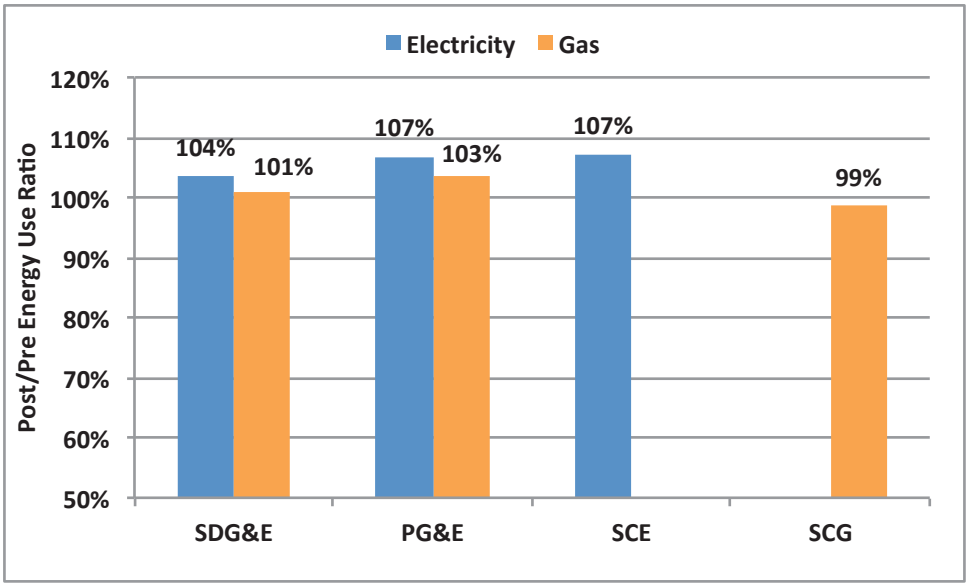
3.1.2 Analysis of Participation Energy Consumption

While weather conditions are important for determining impacts, they are only one of several important influences. As discussed throughout this report, there are a myriad of other factors impacting the energy savings estimates, and the trends discussed here from the weather data are sometimes overwhelmed by these other forces.

As the following graphs show, isolating the effect of the measures on overall household energy consumption has been particularly challenging in this evaluation, as energy use among participants has generally increased between the pre-participation and post-participation periods.

A simple measure of this trend is shown in Figure 15. In this graph, the energy use in the period after ESA Program participation is divided by energy use in the pre-participation period. If nothing else changes between the two periods, we would expect that the installation of the ESA measures would cause a decrease in energy use in the post-participation period, and the ratio would be less than 100 percent. For electricity, all of the IOUs showed a slight increase in energy use between the two periods, as demonstrated by the ratio values greater than 100 percent. For gas, consumption was approximately unchanged between the two periods.

Figure 15: Post-Participation Energy Use as a Percentage of Pre-Participation Use



If the increase in energy use is primarily due to increases in weather (either CDD or HDD), then the increasing consumption can be controlled for in the model through the inclusion of weather variables, which we have done in our model specifications. To determine if there are additional factors affecting energy use, we have developed a metric to determine how much energy consumption changes while holding the effect of weather constant. This was done by dividing energy consumption by cooling degree days to obtain the average kWh used per CDD for both the pre-participation and post-participation periods. A similar calculation was done using HDD for both electricity and gas consumption. Changes in these weather-normalized variables between the two periods indicates the degree to which factors other than weather are affecting energy use for ESA participants.

Figure 16 shows the percentage of households that have weather-normalized electricity use (measured as kWh consumption divided by CDD or HDD) increasing in the post-participation period. For days with heating (the orange bars), there were a significant number of households in each utility that had an increase in weather-normalized electricity use, with over 60 percent of the households in SDG&E and SCE having an increase in the period directly after participating in the ESA Program. This affect was less pronounced for the cooling (the blue bars), with PG&E having over 60 percent of households with an increase in weather-normalized electricity use after participating in the ESA Program. This indicates that there are a substantial number of households that have an increase in energy use after participating in the ESA Program, and that this increase cannot be explained entirely by changes in weather alone.

Figure 16: Percentage of Households with Weather-normalized Energy Use Increasing After ESA Participation (Electricity)

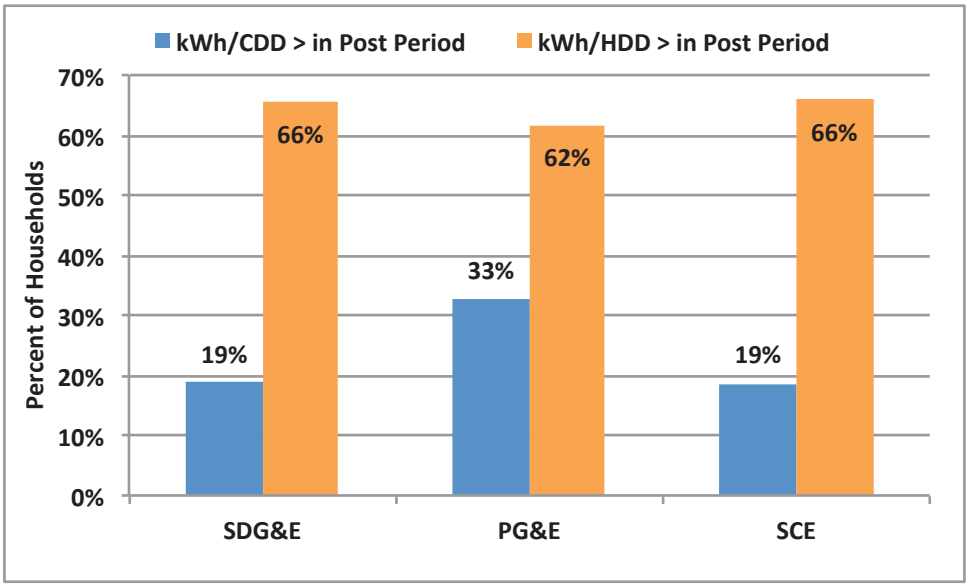
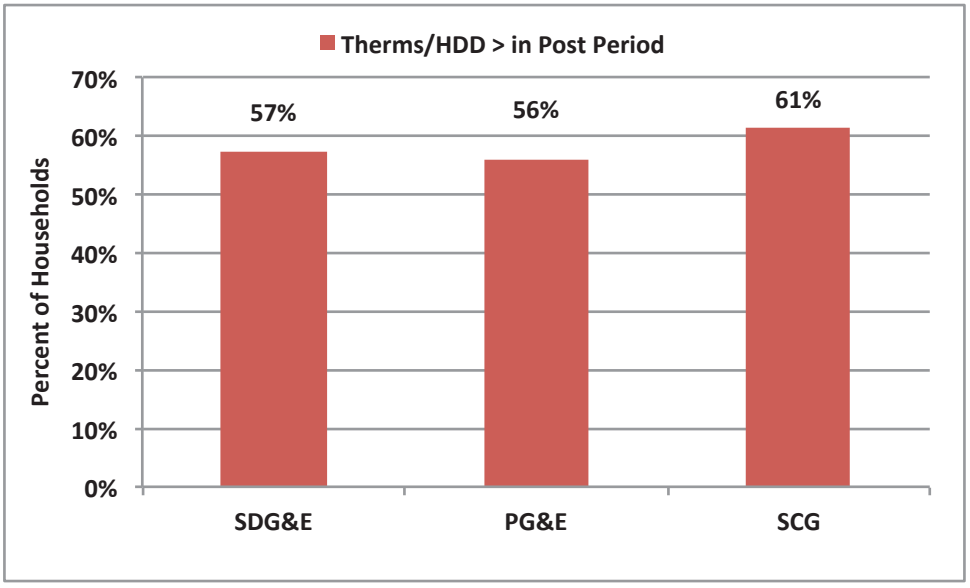


Figure 17 shows the analogous information for gas usage. In this case, all of the utilities had approximately 60 percent of participants increasing their weather-normalized gas consumption in the post-participation period.

Figure 17: Percentage of Households with Weather-normalized Energy Use Increasing After ESA Participation (Gas)



The trend toward more energy use (both electricity and gas) represents a challenge for the billing regression. In the case where the post-installation energy usage is greater than the pre-installation usage, energy savings from the measures installed through the ESA program are masked by other changes that occur in the home that have lead to an overall increase in energy consumption. Given the nature of the fixed effects model run on the participant population, there is limited information available to control for these other effects. There are indicator variables for both individual household characteristics and time trends, which will control for some of the factors leading to increased energy use. Variables in the model for cooling degree and heating degree days will control for weather effects, although the preceding graphs indicate that there is a substantial amount of increased energy consumption that is due to factors other than weather. To the extent that there is a significant amount of increased energy use that is not controlled for in the model, this will bias downward the impact estimates derived from the measure variable coefficients.

The remainder of this chapter presents the fixed effects regression model results for the Basic Model by utility for each fuel type. Additional model results showing the Measure Model and Whole House regression output are provided in Appendix C.

3.2 Electric Models (Basic Model Specification)

Table 9, Table 10, and Table 11 show the regression estimation model results for the Basic Model specification for electric measures included in the PY2011 ESA Program. Models were estimated separately for each IOU, with coefficients for each of the measure groups that had significant amounts of participation.

In general, the estimation results were as expected, with most of the coefficient estimates statistically significant at the five percent level. For the measure coefficients, a negative value indicates a decrease in usage (i.e., savings) in the post-participation period. Note that savings cannot be calculated from

the measure coefficients alone, as the coefficients for the measure/weather interaction terms (along with the average weather values) need to be included in the calculation.

Table 9: SDG&E Electric Regression Results (Basic Model)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.34	0.00	129.12	0.00	179.08
CDD	0.80	0.01	129.90	0.00	70.56
RoomAC	-8.33	3.62	-2.30	0.02	0.01
DuctTestSeal	-20.88	3.92	-5.32	0.00	0.03
ClothesWasher	-10.25	1.32	-7.78	0.00	0.04
HardwiredLighting	-2.88	0.77	-3.72	0.00	0.16
Insulation	-23.10	4.99	-4.63	0.00	0.02
Lighting	-3.08	0.70	-4.39	0.00	0.48
Microwave	3.29	1.07	3.09	0.00	0.04
Refrigerator	-53.37	1.30	-41.10	0.00	0.04
HWConservation	-7.10	1.30	-5.47	0.00	0.41
WHRepairReplace	0.87	1.46	0.60	0.55	0.03
Weatherization	7.95	1.60	4.96	0.00	0.39
RoomAC*CDD	0.06	0.02	3.16	0.00	0.70
DuctTestSeal*CDD	0.23	0.02	9.97	0.00	2.11
DuctTestSeal*HDD	0.00	0.01	0.18	0.86	4.20
Insulation*CDD	0.05	0.03	1.79	0.07	1.69
Insulation*HDD	0.07	0.02	3.73	0.00	3.46
Weatherization*CDD	0.01	0.01	0.68	0.49	32.08
Weatherization*HDD	0.00	0.00	0.46	0.65	64.18
Adjusted R-squared	0.80				

Table 10: PG&E Electric Model Results (Basic Model)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.65	0.00	465.37	0.00	235.37
CDD	1.26	0.00	705.99	0.00	112.20
CentralAC	49.86	12.00	4.16	0.00	0.00
CentralACTuneUp	-31.02	0.94	-33.18	0.00	0.05
CFL	7.66	0.69	11.17	0.00	0.45
Ducts	-15.88	1.27	-12.48	0.00	0.02
EvaporativeCooler	-27.44	1.57	-17.53	0.00	0.03
HardwiredLighting	-0.15	0.60	-0.26	0.80	0.40
Insulation	-0.79	2.04	-0.39	0.70	0.03
Lighting	-0.06	0.54	-0.12	0.91	0.12
Refrigerator	-54.61	0.68	-79.80	0.00	0.07
RoomAC	50.82	2.01	25.26	0.00	0.01
HWConservation	2.38	0.56	4.27	0.00	0.35
Weatherization	45.06	0.87	52.01	0.00	0.30
CentralAC*CDD	-0.30	0.04	-8.45	0.00	2.57
CentralACTuneUp*CDD	0.32	0.00	96.42	0.00	9.29
Ducts*CDD	0.08	0.01	9.55	0.00	3.27
EvaporativeCooler*CDD	0.19	0.00	44.67	0.00	5.71
Insulation*CDD	-0.09	0.01	-11.07	0.00	3.06
Insulation*HDD	-0.01	0.01	-2.17	0.03	6.56
RoomAC*CDD	-0.28	0.01	-43.96	0.00	2.47
Weatherization*CDD	-0.08	0.00	-29.27	0.00	36.14
Weatherization*HDD	-0.16	0.00	-69.20	0.00	64.71
Adjusted R-squared	0.79				

Table 11: SCE Electric Model Results (Basic Model)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
CDD	1.26	0.00	800.97	0.00	126.32
HDD	0.47	0.00	396.84	0.00	183.32
RoomAC	54.68	3.16	17.32	0.00	0.00
CentralAC	-41.42	5.38	-7.71	0.00	0.03
CFL	-5.94	0.28	-20.88	0.00	0.35
Ducts	-19.71	6.23	-3.17	0.00	0.02
EvaporativeCooler	-7.84	0.87	-9.01	0.00	0.08
Lighting	-3.23	1.23	-2.62	0.01	0.02
PoolPump	-40.74	2.91	-14.02	0.00	0.01
Refrigerator	-64.50	0.55	-116.72	0.00	0.08
HWConservation	-60.08	7.21	-8.33	0.00	0.00
Weatherization	-62.70	7.71	-8.13	0.00	0.00
CentralACTuneUp	-16.59	17.30	-0.96	0.34	0.00
RoomAC*CDD	-0.24	0.01	-24.64	0.00	0.92
CentralAC*CDD	0.09	0.01	8.01	0.00	6.12
Ducts*CDD	0.02	0.01	1.88	0.06	5.55
Ducts*HDD	0.16	0.01	21.55	0.00	4.61
EvaporativeCooler*CDD	-0.07	0.00	-24.19	0.00	16.41
PoolPump*CDD	0.41	0.01	43.69	0.00	1.99
Weatherization*CDD	-0.23	0.02	-9.64	0.00	0.55
Weatherization*HDD	0.59	0.02	24.48	0.00	0.62
CentralACTuneUp*CDD	0.19	0.04	5.26	0.00	0.06
Adjusted R-squared	0.77				

3.3 Gas Models (Basic Model Specification)

Table 12, Table 13 and Table 14 show the analogous regression results for PY2011 ESA Program gas measures, by utility and using the Basic Model specification. As with the electric models, the estimation results for the gas models are as expected, with most coefficient estimates statistically significant at the five percent level. Negative coefficient estimates reflect savings and the impact estimates are calculated based on the measure coefficient estimate combined with the coefficient estimates and average values for the measure/HDD interaction terms.

Table 12: SDG&E Gas Model Results (Basic Model)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.07	0.00	322.74	0.00	177.79
Ducts	-3.80	0.22	-17.45	0.00	0.04
FurnaceRepairReplace	-0.08	0.13	-0.57	0.57	0.14
FurnaceCleanTune	-4.52	0.12	-36.67	0.00	0.26
ClothesWasher	-1.32	0.12	-10.89	0.00	0.06
Insulation	-4.19	0.25	-16.94	0.00	0.03
FurnacePilotLight	-1.26	0.16	-8.08	0.00	0.03
HWConservation	0.51	0.12	4.31	0.00	0.44
WHRepairReplace	-0.57	0.14	-4.02	0.00	0.05
Weatherization	2.28	0.15	15.16	0.00	0.39
Ducts*HDD	0.01	0.00	16.88	0.00	6.58
FurnaceRepairReplace*HDD	0.01	0.00	11.90	0.00	22.95
FurnaceCleanTune*HDD	0.02	0.00	41.97	0.00	42.74
Insulation*HDD	0.01	0.00	11.16	0.00	5.22
Weatherization*HDD	-0.01	0.00	-33.81	0.00	64.97
Adjusted R-squared	0.65				

Table 13: PG&E Gas Model Results (Basic Model)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.11	0.00	1078.89	0.00	232.38
Ducts	-8.34	0.17	-48.22	0.00	0.02
FurnaceRepair	3.20	0.19	16.87	0.00	0.01
FurnaceReplace	3.42	0.25	13.77	0.00	0.01
Insulation	-5.37	0.12	-44.69	0.00	0.04
HWConservation	0.30	0.05	6.52	0.00	0.41
WHRepairReplace	-0.46	0.31	-1.51	0.13	0.01
Weatherization	1.40	0.06	21.51	0.00	0.36
Ducts*HDD	0.03	0.00	57.27	0.00	4.35
FurnaceRepair*HDD	0.00	0.00	0.52	0.61	2.61
FurnaceReplace*HDD	0.00	0.00	-1.89	0.06	1.56
Insulation*HDD	0.01	0.00	19.51	0.00	8.36
Weatherization*HDD	-0.01	0.00	-31.13	0.00	78.56
Adjusted R-squared	0.81				

Table 14: SoCal Gas Model Results (Basic Model)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.10	0.00	1197.08	0.00	177.35
Ducts	-4.37	0.15	-28.87	0.00	0.01
FurnaceRepairReplace	2.40	0.06	41.25	0.00	0.06
FurnaceCleanTune	-3.98	0.05	-72.76	0.00	0.09
ClothesWasher	-2.57	0.10	-26.45	0.00	0.01
Insulation	-3.40	0.08	-40.73	0.00	0.04
HWConservation	-0.28	0.05	-5.76	0.00	0.50
WHRepairReplace	-0.29	0.18	-1.61	0.11	0.01
Weatherization	2.13	0.05	39.25	0.00	0.47
Ducts*HDD	0.02	0.00	29.05	0.00	1.80
FurnaceRepairReplace*HDD	0.01	0.00	27.79	0.00	9.35
FurnaceCleanTune*HDD	0.02	0.00	95.64	0.00	15.30
Insulation*HDD	0.01	0.00	21.37	0.00	5.98
Weatherization*HDD	-0.01	0.00	-111.63	0.00	77.42
Adjusted R-squared	0.67				

3.4 Measure and Whole House Models

In addition to the Basic and Measure Model specifications, we also developed a Whole House model that estimates energy savings at the household level. With this model, savings are estimated as a total value for the entire house and are not broken out by measure group. The regression results for the Whole House models are provided in Appendix C, which includes 27 different models covering each IOU, fuel, and home type.

Additional regression results for each of the Measure Models (by IOU) for the electric and gas measures are also provided in Appendix C.

The estimated energy savings calculated from the Measure and Whole House models are discussed with the Basic Model estimates in the next chapter.

4 Impact Estimates

The results of the regression models were used to calculate impacts for each measure group by IOU, house type and climate zone. The impact results by IOU are discussed in this chapter, with more detailed impact results, including those by house type and climate zone, provided in Appendix D.

Energy savings values were assigned to a measure group using the following algorithm:

1. If the 95 percent confidence interval of the impact estimate from the Basic Model included the *ex ante* savings value, then the estimate from the Basic Model was used.
2. If the confidence interval for Basic Model estimate did not include the *ex ante* value, then evaluator judgment was used to assign an impact value from among the Basic Model, Measure Model, or *ex ante* values.
3. In a couple of instances, an engineering estimate was assigned when the *ex ante* values appeared to be unusually high and neither of the regression models could provide a reasonable result.

The impact estimates using these assignments are discussed below by fuel type. In most cases, we assigned the value from the Basic Model as often as possible.

4.1 Electric Impact Estimates

Table 15, Table 16 and Table 17 show the electric impacts by measure group. For each measure, the *ex ante*, Basic Model and Measure Model estimates are provided, along with information on the impact estimates from the PY2009 ESA Program evaluation. Note that in cases where the regression models estimate an increase in energy use, the estimated impact has been set to zero in the table.

The source of the final impact number assignment is shown in the highlighted column of each table. Using the final assigned values, the total average household savings is shown at the bottom of the table for each IOU. The far right column of the tables also shows the impact estimates from the PY2009 evaluation, both at the measure-group and household level. Note that impacts on a per unit level (rather than per household, where multiple units may be installed) are shown in the detailed impacts estimates provided in Appendix D.

As can be seen from these tables, there is a significant amount of variation on how well the current impact estimates (from either the Basic or Measure Model) match the *ex ante* values. In some cases, such as refrigerators, they are similar, while in others the regression estimates are substantially different from the *ex ante* savings values.

Our engineering team reviewed those measures where the algorithm assigned the *ex ante* values to assess if the *ex ante* values appeared reasonable. In the case of the SCE values for AC Tune-up[30], an alternative value was calculated based on engineering estimates for these measures.

[30] The new AC Tune Up value is assumes a 3-ton unit installed in single family and mobile homes, and a 2-ton unit for multifamily. Savings estimate is based on DEER values using the refrigerant charge, airflow adjustment measures (weighted equally).

For SCE Pool Pumps, an alternative value was also calculated based on an engineer review of the available literature. The savings for the SCE pool pump measure were reduced from the claimed savings of 1,686 kWh per year to 1,088 kWh per year based on this analysis. The 1,088 kWh per year savings value is consistent with the expected savings presented in a Residential Pool Pump Measure Revisions document presented to the California Energy Commission by PG&E in 2008.[31] To verify this value, the savings were also calculated using information presented in a recent Residential Pool Pumps and Motors response by the IOUs to the California Energy Commission.[32] Based on this document, the majority of California pool pumps are between one and 1.5 horsepower. Using an average value of 1.25 HP, and the hours of operation for single and multiple speed pumps (as indicated in the same document) the resulting savings are approximately 1,088 kWh annually.

Once the final savings values are assigned and the whole house savings calculated, the aggregated effect increases total household savings slightly from the PY2009 evaluation for SCE, while SDG&E and PG&E both experience decreases relative to the previous evaluation estimates.

Table 15: SDG&E Electric Impact Estimates (kWh)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Room AC	305	27.40	99.88	42.11	27.40	Basic Model	50
Central AC	30	N/A	N/A	38.66	38.66	*Ex ante*	50
AC Tune-up	59	N/A	N/A	229.13	229.13	*Ex ante*	326
CFLs	16,434	N/A	N/A	112.11	112.11	*Ex ante*	93
Ducts	937	55.72	1.36	0.00	55.72	Basic Model	-
Clothes Washer	1,667	123.05	86.94	528.57	123.05	Basic Model	788
Hardwired lighting	6,623	34.61	0.00	115.05	115.05	*Ex ante*	100
Insulation	800	85.53	359.74	94.90	85.53	Basic Model	104
Lighting	20,825	36.99	30.35	60.48	36.99	Basic Model	346
Microwave	1,852	0.00	66.52	175.91	66.52	Measure Model	-
Refrigerator	1,808	640.42	399.40	722.11	640.42	Basic Model	697
HW Conservation	1,334	85.19	60.30	172.03	172.03	*Ex ante*	24
WH Repair/Replace	5	0.00	0.00	0.00	0.00	*Ex ante*	-
Weatherization	16,703	0.00	0.00	49.59	49.59	*Ex ante*	63
Average household savings		**119.71**	**92.92**	**346.35**	**278.57**		**303**

[31] http://www.energy.ca.gov/appliances/2008rulemaking/documents/2008-05-15_workshop/other/PGE_Updated_Proposal_Information_Template_for_Residential_Pool_Pump_Measure_Revisions.pdf.

[32] http://www.energy.ca.gov/appliances/2013rulemaking/documents/responses/Residential_Pool_Pumps_and_Replacement_Motors_12-AAER-2F/California_IOUs_Response_to_the_Invitation_to_Participate_for_Residential_Pool_Pumps_and_Motors_2013-05-09_TN-70822.pdf.

Table 16: PG&E Electric Impacts (kWh)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Central AC	79	141.04	116.53	317.35	141.04	Basic Model	50
AC Tune-up	12,143	0.00	0.00	230.04	230.04	*Ex ante*	326
CFLs	99,402	0.00	0.00	75.29	75.29	*Ex ante*	--
Ducts	3,007	112.26	10.59	94.33	112.26	Basic Model	--
Evaporative Cooler	5,841	0.00	0.00	262.15	262.15	*Ex ante*	502
Hardwired lighting	87,276	1.85	0.00	145.74	145.74	*Ex ante*	100
Insulation	6,290	145.41	0.00	46.69	145.41	Basic Model	104
Lighting	26,414	0.75	0.00	140.47	140.47	*Ex ante*	346
Refrigerator	16,773	655.36	427.92	766.89	655.36	Basic Model	697
HW Conservation	11	0.00	0.00	273.30	273.30	*Ex ante*	24
Weatherization	64,837	3.51	0.00	9.99	3.51	Basic Model	63
Room AC	3,175	0.00	0.00	111.56	111.56	*Ex Ante*	50
Average household savings		**113.11**	**64.47**	**381.46**	**366.90**		**402**

Table 17: SCE Impact Estimates (kWh)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Room AC	927	0.00	57.51	69.47	57.51	Measure Model	50
Central AC	4,869	309.18	160.69	150.41	160.69	Measure Model	-
AC Tune-up	32	0.00	0.00	1265.00	257.00	Engineering Est.	326
CFL	67,872	71.25	82.25	25.44	71.25	Basic Model	93
Central Heat Pumps (CHP)	137	N/A	N/A	695.24	695.24	*Ex ante*	-
Ducts	4,490	0.00	20.65	0.00	20.65	Measure Model	-
Evaporative Cooler	15,928	239.16	448.48	481.87	448.48	Measure Model	502
Evaporative Cooler Tune-up	9	N/A	8236.20	37.13	37.13	*Ex ante*	-
Lighting	3,390	38.73	145.09	161.33	145.09	Measure Model	346
Pool Pump	1,908	0.00	0.00	1686.00	1088.00	Engineering Est.	-
Refrigerator	16,714	773.99	768.14	704.03	773.99	Basic Model	697
HW Conservation	505	720.97	1255.32	83.00	83.00	*Ex ante*	24
Weatherization	722	0.00	0.00	51.14	51.14	Ex ante	63
Average household savings		**230.31**	**270.46**	**253.38**	**279.26**		**247**

4.2 Gas Impact Estimates

The gas impact estimates are shown in Table 18, Table 19 and Table 20, and use the same savings assignment algorithm discussed above for the electric measures. Note that in cases where the Basic or Measure Model resulted in estimates of increased energy use, a savings value of zero is assigned to that measure. At the household level, average household savings increased substantially for all three utilities relative to the PY2009 evaluation.

Table 18: SDG&E Gas Savings (therms)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Ducts	930	14.54	13.48	0.00	14.54	Basic Model	-
Furnace Repair/Replace	3,666	0.00	0.00	0.00	0.00	*Ex Ante*	-
Furnace Clean & Tune	6,551	9.81	4.02	0.00	9.81	Basic Model	
Clothes Washer	1,585	15.88	14.42	35.88	15.88	Basic Model	-
Insulation	732	26.66	5.35	9.17	26.66	Basic Model	10
Pilot Light Change Out	985	15.10	18.50	11.85	15.10	Basic Model	-
HW Conservation	11,125	0.00	0.00	15.49	15.49	*Ex ante*	7
WH Repair/Replace	1,236	6.80	0.00	0.00	6.80	Basic Model	-
Weatherization	9,113	3.24	0.85	5.01	3.24	Basic Model	4
Average household savings		**13.14**	**6.87**	**21.99**	**26.06**		**8**

Table 19: PG&E Gas Savings (therms)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Ducts	3,578	17.17	12.10	32.75	17.17	Basic Model	0
Furnace Repair	2,197	0.00	0.00	3.21	3.21	*Ex ante*	0
Furnace Replace	1,218	0.00	0.00	3.31	3.31	*Ex ante*	0
Insulation	7,165	44.50	22.13	61.05	44.50	Basic Model	10
HW Conservation	80,871	0.00	0.00	13.92	13.92	*Ex ante*	7
WH Repair/Replace	1,326	5.58	0.00	11.68	5.58	Basic Model	0
Weatherization	69,656	0.00	0.00	9.46	9.46	*Ex ante*	4
Average household savings		**3.82**	**1.99**	**23.29**	**21.50**		**9**

Table 20: SoCal Gas Savings (therms)

Measure	Households Receiving Measure	Basic Model	Measure Model	Average *Ex Ante* Savings	Final Assignment	Final Source	PY2009 Savings Estimate
Ducts	2,629	15.37	0.00	0.00	15.37	Basic Model	-
Furnace Repair/Replace	15,644	0.00	0.00	0.00	0.00	*Ex ante*	-
Furnace Clean & Tune	20,016	5.65	15.55	2.70	5.65	Basic Model	-
Clothes Washer	4,648	30.88	30.96	27.30	30.88	Basic Model	-
Insulation	8,225	26.51	17.49	7.76	26.51	Basic Model	10
Pilot Light Conversion	109	N/A	N/A	44.31	44.31	Ex ante	
HW Conservation	113,312	3.31	5.43	7.00	5.43	Measure Model	7
WH Repair/Replace	1,812	3.52	1.30	0.00	3.52	Basic Model	-
Weatherization	108,402	3.98	2.74	4.00	3.98	Basic Model	4
Average household savings		**11.31**	**12.90**	**12.58**	**13.40**		**11**

4.3 Impact Results Discussion

When reviewing the impact estimates, it is important to place the relative magnitude of the expected savings within the context of overall household energy consumption. Table 21 provides this comparison by utility for both electricity and gas. In each case, the expected savings is a relatively small fraction of annual energy consumption, ranging from three to nine percent. Even if the *ex ante* savings or impact estimates from the PY2009 evaluation were used in the comparison, the savings are

still only a small portion of overall energy consumption. This small amount of savings increases the challenges of isolating the effect of the ESA Program from the other factors influencing energy use.

Table 21: Comparison of Annual Savings and Energy Consumption

	Evaluation Savings	Annual Consumption	Savings as % of Annual Consumption
Electricity (kWh)			
SDG&E	278.57	4,897	6%
PG&E	366.90	7,132	5%
SCE	279.26	6,276	4%
Gas (therms)			
SDG&E	26.06	288	9%
PG&E	21.50	450	5%
SoCal Gas	13.40	388	3%

It should also be noted that, despite the variation in impact estimates across program years and utilities, the current evaluation impact estimates are relatively close to the original *ex ante* values. Table 22 shows the realization rates at the household level, which is simply the estimated household savings using the current evaluation impact estimates divided by the estimated household savings using the *ex ante* savings values. With the exception of the SDG&E electric measures, in general the evaluation estimates are reasonably consistent with the *ex ante* values. The realization rate metric is somewhat misleading in this application, however, as some of the evaluation assigned values were in fact the *ex ante* values, which move the realization rate closer to 1.0. Nevertheless, the realization rate metric does show that the savings values recommended by the evaluation team are fairly close to the original savings estimates provided by the IOUs.

Table 22: ESA Impact Evaluation Realization Rates

	Evaluation Savings	*Ex Ante* Savings	Realization Rate
Electricity (kWh)			
SDG&E	278.57	346.35	0.80
PG&E	366.90	381.46	0.96
SCE	279.26	253.38	1.10
Gas (therms)			
SDG&E	26.06	21.99	1.19
PG&E	21.50	23.29	0.92
SoCal Gas	13.40	12.58	1.07

While there is some consistency with current evaluation savings estimates and the *ex ante* values at the household level, there are some obvious differences in savings estimates for individual measures. The electric impact models provide a range of savings estimates – some of which have internal consistency while other measures show significant variation across utilities, the previous evaluation

results, and individual *ex ante* values. While we attempted to explore reasons for these differences, it was not possible with the current budget and timeline to explore in-depth all the possible reasons for variations across models, utilities, and the results of the previous evaluation.

It is also important to note that – as discussed in the previous impact evaluation – there are legitimate reasons for savings numbers to vary both across time and utilities. In particular, with regard to comparing evaluation estimates across time, one must not conclude from these differences that one set of estimates is 'correct' or 'more accurate' than the other; the estimates may be equally accurate but reflecting different market conditions inherent in two different evaluation periods.

Table 23 shows the current PY2011 impact estimates compared with the whole house savings estimates from prior evaluation years. Since 2000, there has been a wide range of savings estimates for both gas and electricity at the household level. For electricity, the current impact estimates are lower than those from PY2009 and PY2005, but in line with estimates from PY2000-PY2002. For gas, the current impact estimates are significantly higher than those from PY2009 and generally consistent with impacts from earlier evaluations.

Table 23: Impact Estimate Comparison with Prior Evaluations

	PY2011 Evaluation	PY2009 Evaluation	PY2005 Evaluation	PY2002 Evaluation	PY2001 Evaluation	PY2000 Evaluation
Electric Savings (kWh)						
PG&E	367	402	433	399	236	240
SCE	279	247	435	286	203	153
SDG&E	279	303	342	370	215	89
Gas Savings (therms)						
PG&E	21	9	19	9	18	28
SDG&E	26	8	14	4	13	13
SoCal Gas	13	11	17	17	20	26

There are a multitude of factors that can result in different levels of savings across program years and utilities, and some of the more prevalent influences are discussed below.

Energy consumption. Households that use more energy may have the potential for greater energy savings, depending on what end uses are driving energy consumption. Differences in household energy use across both utilities and evaluation periods may account for some of the differences observed in the estimated energy savings. Additionally, it is not just the levels of energy use that are important, but also the degree to which energy consumption changes between pre-participation and post-participation periods. Changes in energy use between these two periods (and the degree to which this inter-period change differs from changes in other utilities and time periods) will also result in different impact estimates.

Household composition. One of the most important factors determining energy use is the number of occupants within a home. Those households with more people typically use more energy (all else equal). Similarly, differences in the household structures themselves will lead to differences in energy impacts. Homes with larger or older structures will likely have a greater potential for energy savings, as will homes in disrepair (requiring more energy to heat and cool) or containing older appliances (requiring more energy to run).

Weather. Weather has an important influence on energy savings, particular for 'weather sensitive' measures where use and energy savings will vary directly with changes in weather. In the current evaluation, weather is incorporated directly into the savings calculations for those measures where we can reasonably expect savings to vary with changes in temperature. The discussion earlier in this report illustrates how weather has changed between the current and prior evaluations, both in terms in the amount of heating degree and cooling degree days, as well as the distribution of participants across climate zones. Also note that – while the climate zones have been defined to have similar weather within each zone – there is still often significant variation in temperatures within a climate zone, particularly for those zones that include the hottest and coldest areas.

Measure mix. The amount of total household savings will vary by the type and quantity of measures installed. This is important to remember when considering that many of the savings estimates from the regression models are for groups of measures, such as weatherization and hot water conservation. While these are by necessity modeled as a single group in the regression (to mitigate collinearity), customers may have different amounts of the individual measure components installed within each group. These differences in measure group composition will lead to differences in savings estimates across utilities and across evaluations.

Different estimation methods. For the current evaluation, we have used the same model specification and data screening process for each utility, so different analysis methods will not explain differences in the current estimates across utilities. The current models, however, are different than what were used in the previous two impact evaluations (PY2009 and PY2005), which in turn were different than the models used in the earlier evaluations (PY2000, PY2001, PY2002). We attempted to develop impact estimates in the current evaluation using the same model specification from the 2009 evaluation, but this was abandoned due to high collinearity issues and because many of the measure-level impact estimates were showing an increase in energy use for some measures. While we believe that the current models are an improvement over earlier evaluations, the different specifications will result in different energy savings estimates.

Savings small relative to overall energy consumption. Finally, it should be noted that for many of the measures installed in the ESA program, the amount of savings expected is small relative to overall household consumption. This is particularly true for some of the most common measures such as CFLs, lighting, weatherization, and hot water conservation. Given the small amount of savings, it is challenging to develop rigorous estimates that are consistent across utilities and evaluations from prior years – even if the exact same model specifications are used. The small amount of savings involved, combined with a lack of information on other influencing factors (discussed above) can result in the ESA Program savings being overwhelmed in the regression model by these other forces.

4.4 Demand Impact Estimates

As discussed in the Research Methods chapter, the demand impacts are calculated by applying the kWh-to-kW conversion factors from Table 3 to the kWh impacts shown in Table 15, Table 16 and Table 17. Detailed demand impacts by housing type and climate zone are presented in Appendix D.

4.5 Whole House Impact Estimates

4.5.1 Electric Impacts

The Whole House regression models were also estimated in an attempt to estimate whole house savings without parsing savings into the individual measures. The estimates for whole house savings are shown for electricity in Table 24 for all home types. As can be seen from these results, the Whole House model produced impact estimates that vary significantly both across utilities and housing types.

Table 24: Whole House Model Impact Estimates (kWh)

	Single Family	Multi-family	Mobile Home
SDG&E	157.53	42.99	196.59
PG&E	35.68	70.38	-27.17
SCE	266.57	307.56	273.53

Table 25 shows the comparison of the Whole House Model for just Single Family, compared with the assigned values from the Basic/Measure Models and the household estimate from the PY2009 evaluation (which used a similar assignment method to the current Basic/Measure Model approach).

The lower savings values from the Whole House Model are due in part to the significant number of households that had an increase in energy usage in the post-installation period, which had an overall dampening effect on energy savings. Another important factor is that the Whole House model does not allow us to isolate those measures that are showing an increase in energy use in the regression model. For these cases in the Basic Model, the positive savings values were set to zero and the *ex ante* value assigned in its place to calculate the whole house savings. This post-model adjustment is not possible in the Whole House Model, which results in a lower overall savings estimate.

Table 25: Single Family Whole House Impact Estimates (kWh)

	Whole House Model	Basic/Measure Model Results	PY2009 Estimate
SDG&E	157.53	278.57	303.00
PG&E	35.68	366.90	402.00
SoCal Gas	266.57	279.26	247.00

4.5.1 Gas Impacts

Whole house savings estimates for gas were also obtained using the Whole House Model specification, and these are shown by housing type in Table 26. These estimates are somewhat more consistent across utilities, although the model was unable to produce an estimate for mobile homes for PG&E.

Table 26: Whole House Model Impact Estimates (therms)

	Single Family	Multi-family	Mobile Home
SDG&E	8.13	5.57	14.71
PG&E	7.64	3.79	-0.80
SCG	9.47	3.31	14.90

Table 27 shows the comparison of the single family gas impact estimates. As with electricity, the Whole House Model produced much lower gas savings estimates than either the Basic/Measure model assignments.

Table 27: Single Family Whole House Impact Estimates (therms)

	Whole House Model	Basic/Measure Model Results	PY2009 Estimate
SDG&E	8.13	26.06	8.00
PG&E	7.64	21.50	9.00
SCG	9.47	13.40	11.00

4.6 Impact Estimate Comparison with DEER Values

After estimating energy savings impacts (kWh and therms), the PY2011 evaluation savings estimates were compared to the appropriate impact values in DEER.[33] Given the wide variation in impact estimates observed over the past few ESA Program evaluations, a comparison with DEER values is appropriate to determine if the latest savings estimates are significantly different from them, even though the DEER values are estimated from the general customer population and not limited to just low income households.

Many of the measures listed in the DEER are delineated by efficiency rating and assumed base case equipment. Additionally, within each DEER measure, the savings values provided are broken out by utility and climate zone. This required that the evaluation team review a wide range of detailed DEER savings values and match the appropriate values to the more aggregated estimates obtained from the billing regressions. The values used for comparison are the "Whole Building Above Customer-Average Impacts." These DEER values reflect the savings using the existing home conditions as the baseline, as opposed assuming a standard efficiency replacement value equal to code. Because the existing conditions are also what are utilized in the billing regression to estimate savings, choosing the analogous values in DEER enables a more consistent basis for comparison.

In order to compute a single value for each utility and measure category, the DEER data were compiled, assigned a measure category, and aggregated based on measure category and utility. The resulting compilation produced a single set of average energy savings values (kWh and therms) for each utility and measure category. Using this method, we were able to match 91 percent of the

[33] The DEER database can be accessed at www.energy.ca.gov/deer/.

electric measures and 70 percent of the gas measures installed through the ESA Program with similar measures in the DEER database.

Comparisons of the relevant DEER, evaluation and *ex ante* savings values are presented below by utility, measure category and fuel type. Additionally, the number of ESA Program participants installing at least one measure in a given measure category are included in the tables below as well.

Table 28 and Table 29 show the comparison of the PY2011 evaluation savings estimates with the corresponding DEER values. Note that the evaluation and *ex ante* savings values are per household and the DEER values are per unit, so it is not entirely a consistent comparison. The DEER database does provide a range of savings values by home size, and the savings values for smaller home sizes in DEER might match more closely with the estimates for the ESA Program participants, who are often in smaller homes. We did not attempt to explore this issue further in the current evaluation, however. Notable discrepancies between the DEER and evaluation savings values include the much higher *ex ante* values for AC tune-up, particularly for the SCE *ex ante* value. The DEER values for insulation are negative, due presumably to interactive or snapback effects incorporated into the DEER values, which are not included in the evaluation savings values. Refrigerator savings estimates from the evaluation are consistently higher than the DEER values, which may be reflecting an older stock of existing refrigerators in low-income households relative to the general population.

Table 28: Comparison of PY2011 Evaluation, DEER and *Ex Ante* Impact Estimates (kWh)

Utility	Measure Category	Number of Participants	DEER kWh Savings (per unit)	Evaluation kWh Savings (per household)	*Ex Ante* kWh Savings (per household)
PG&E	Central AC	79	192.22	141.04	317.35
PG&E	Central AC Tune-Up	12,143	95.46	230.04	230.04
PG&E	CFL	99,402	16.56	75.29	75.29
PG&E	Ducts	3,007	97.30	112.26	94.33
PG&E	Evaporative Cooler	5,841	292.29	262.13	262.15
PG&E	Insulation	6,290	-47.13	145.41	46.69
PG&E	Refrigerator	16,773	178.79	655.36	766.89
PG&E	Weatherization	64,837	0.51	3.51	9.99
SCE	Central AC	4,869	219.63	160.69	150.41
SCE	Central AC Tune-Up	32	107.51	257.00	1265.00
SCE	CFL	67,872	17.63	71.25	25.44
SCE	Ducts	4,490	121.38	20.65	-
SCE	Evaporative Cooler	15,928	398.88	448.48	481.87
SCE	Refrigerator	16,714	199.70	773.99	704.03
SCE	Weatherization	722	0.64	13.00	13.00
SDG&E	Ducts	937	76.21	55.72	-
SDG&E	Insulation	800	-48.90	85.53	94.90
SDG&E	Refrigerator	1,808	192.97	640.42	722.11
SDG&E	Weatherization	16,703	0.46	49.59	49.59

Table 29: Comparison of PY2011 Evaluation, DEER and *Ex Ante* Impacts Estimates (therms)

Utility	Measure Category	Number of Participants	DEER therm Savings (per unit)	Evaluation therm Savings (per household)	*Ex Ante* therm Savings (per household)
PG&E	Ducts	3,578	17.79	17.17	32.75
PG&E	Furnace Repair	2,197	0.57	3.21	3.21
PG&E	Furnace Replace	1218	0.57	3.31	3.31
PG&E	Insulation	7,165	22.29	44.50	61.05
PG&E	Water Heater Repair/Replace	1,326	21	4.69	4.69
PG&E	Weatherization	69,656	0.11	9.46	9.46
SoCal Gas	Ducts	2,629	16.39	15.37	-
SoCal Gas	Furnace Repair/Replace	15,644	0.54	-	-
SoCal Gas	Insulation	8,225	13.79	26.51	7.76
SoCal Gas	Weatherization	108,402	0.14	3.98	4.00
SDG&E	Ducts	930	15.13	14.54	-
SDG&E	Furnace Repair/Replace	3,666	0.52	-	-
SDG&E	Insulation	732	9.71	26.66	9.17
SDG&E	Water Heater Repair/Replace	1,236	19.29	6.80	-
SDG&E	Weatherization	9,113	0.14	3.24	5.01

5 Phone Survey Results

5.1 Phone Survey Sample Design

A separate analysis component of the impact evaluation involved administering a phone survey to a sample of PY2011 ESA Program participants. The Research Plan called for the completion of 600 participant phone surveys, with these surveys targeting those customers that experienced an increase in energy use after participating in the ESA Program. To identify which customers had an increase in usage, we normalized the pre-installation and post-installation data based on HDD and CDD. The result was a measure that identifies households that increase in energy use while controlling for changes in average weather conditions between the two periods.

Table 30 shows the results for the highest 33 percent of those customers experiencing an increase in usage between the pre and post periods based on electricity consumption. Table 31 provides similar information for increases in gas consumption. The left half of the table shows the number of households that are in the top third of increased users, while the right part of the table shows the lower bound for the increase in usage. For example, for PG&E there were 8,830 customers that had at least an 18.83 percent increase in energy usage (based on HDD) between the pre and post-installation periods. These 8,830 customers represent the top 33 percent (i.e., largest increases) of those customers that had an increase in energy usage over the same time period.

Table 30: Number of Customers (Top 33%) Increasing Energy Use (kWh)

Utility	HDD-based Increased Users (Top 33%)	CDD-based Increased Users (Top 33%)	HDD Top 33% Cutoff	CDD Top 33% Cutoff
PG&E	8,830	6,311	+18.83%	+20.60%
SCE	10,570	4,502	+22.97%	+14.53%
SDG&E	1,594	631	+23.00%	+18.00%
SoCal Gas	--	--	--	--

Table 31: Number of Customers (Top 33%) Increasing Energy Use (therms)

Utility	HDD-based Increased Users (Top 33%)	CDD-based Increased Users (Top 33%)	HDD Top 33% Cutoff	CDD Top 33% Cutoff
PG&E	948	516	+18.83%	+20.60%
SCE	--	--	--	--
SDG&E	958	446	+26.00%	+24.00%
SoCal Gas	8,582	5,745	+31.57%	+23.76%

Within this group of increased consumption customers, we next examined whether or not there was any particular measures that occurred more frequently for these customers relative to the entire population of ESA participants. The rationale is that the installation of certain measures like furnace repair might spur an increase in energy use in the post-installation period. The results of this analysis found generally that there were not significant deviations among measures between the increased

energy users and the participant population for each utility. The following tables show the specific measures examined for each utility, and the frequency in which these measures were installed in homes where there was an increase in energy use.

Table 32: PG&E Distribution of Measures for Increased Energy Users (kWh)

Measure Name/Category	HDD-based Increased Users	CDD-based Increased Users
AC	0.4%	0.3%
Caulking	7.9%	8.0%
CFL	14.4%	14.4%
Ducts	0.2%	0.2%
DWH	0.3%	0.3%
Faucet Aerator	8.3%	8.6%
Furnace	0.0%	0.0%
Furnace Repair	0.1%	0.1%
Gaskets	7.8%	7.8%
HWD Lights	17.9%	18.0%
Lighting	2.1%	2.0%
Other	4.7%	4.1%
Refrigerator	0.6%	0.6%
Shower head	7.9%	8.3%
Vent	0.3%	0.3%
Water Heater Blanket	1.7%	1.9%
Weatherization	17.2%	17.1%
Weatherstripping	7.9%	8.0%

Table 33: PG&E Distribution of Measures for Increased Energy Users (Therms)

Measure Name/Category	HDD-based Increased Users	CDD-based Increased Users
AC	0.0%	0.0%
Caulking	13.9%	9.5%
CFL	0.4%	4.8%
Ducts	0.0%	0.2%
Faucet Aerator	14.3%	14.3%
Furnace	0.1%	0.2%
Furnace Repair	0.4%	0.5%
Gaskets	13.6%	13.7%
Shower head	12.9%	12.7%
Vent	0.3%	0.3%
Water Heater Blanket	3.1%	3.0%
Water Heater Repair	0.2%	0.2%
Weatherization	26.7%	26.5%
Weatherstripping	13.9%	13.9%

Table 34: SDG&E Distribution of Measures for Increased Energy Users (kWh)

Measure Name/Category	HDD-based Increased Users	CDD-based Increased Users
AC	0.4%	0.1%
CFL	17.2%	18.0%
Ducts	1.0%	1.3%
Furnace Repair	8.8%	9.7%
High Efficiency Clothes Washer	2.0%	2.2%
Insulation	0.9%	1.1%
Lighting	23.0%	22.2%
Miscellaneous Controls	4.7%	5.1%
Other	1.5%	0.7%
Refrigerator	1.3%	1.0%
Water Heater Conservation	19.3%	18.8%
Water Heater Repair	1.6%	1.6%
Weatherization	18.3%	18.1%

Table 35: SDG&E Distribution of Measures for Increased Energy Users (Therms)

Measure Name/Category	HDD-based Increased Users	CDD-based Increased Users
AC	0.2%	0.2%
CFL	16.0%	16.1%
Ducts	1.6%	1.9%
Furnace Repair	12.5%	13.9%
High Efficiency Clothes Washer	2.5%	2.5%
Insulation	1.0%	1.2%
Lighting	20.5%	19.8%
Refrigerator	2.7%	2.7%
Water Heater Conservation	17.8%	17.4%
Water Heater Repair	2.1%	2.1%
Weatherization	16.1%	16.2%

Table 36: SCE Distribution of Measures for Increased Energy Users (kWh)

Measure Name/Category	HDD-based Increased Users	CDD-based Increased Users
AC	1.9%	1.9%
Caulking	0.1%	0.1%
CFL	23.5%	22.2%
Ducts	1.5%	1.4%
DWH	0.0%	0.0%
Evaporative Cooler	5.1%	4.7%
Faucet Aerator	0.1%	0.1%
Furnace	0.0%	0.0%
Gaskets	0.1%	0.1%
Heat Pump	0.0%	0.0%
Lighting	1.0%	1.1%
Pool Pump	0.7%	0.8%
Refrigerator	2.4%	2.3%
Showerhead	0.1%	0.1%
Water Heater Blanket	0.0%	0.0%
Weatherization	0.1%	0.1%
Weatherstripping	0.2%	0.1%

Table 37: SoCal Gas Distribution of Measures for Increased Energy Users (Therms)

Measure Name/Category	HDD-based Increased Users	CDD-based Increased Users
Clothes Washer	0.3%	0.5%
Ducts	0.3%	0.3%
Furnace	6.7%	8.1%
Furnace Repair	1.8%	1.6%
Insulation	0.8%	0.8%
Water Heater Replace	0.2%	0.2%
Weatherization	69.0%	68.3%
Water Heating Conservation	20.8%	20.2%

Since there were no obvious measures to target that were related to increased energy use, the final phone survey sample was evenly distributed across utilities and households that experienced an increased in normalized energy use for either CDD or HDD (Table 38). In the hopes of identifying behaviors and trends that lead to increased energy use, the sample was further restricted to those customers showing the large increase in energy use between the two periods (i.e., the top 33 percent). The participants were randomly sampled without any specific quotas set for specific measures beyond those shown below.

Table 38: Phone Sample Sizes by Utility and CDD/HDD

Utility	HDD-based Increased Users (Top 33%)	CDD-based Increased Users (Top 33%)	Totals
PG&E	75	75	150
SCE	75	75	150
SDG&E	75	75	150
SoCal Gas	75	75	150
Totals	**300**	**300**	**600**

5.2 Phone Survey Results

This section presents selected results from the participant phone survey, with complete survey response tabulations provided in Appendix B. As noted above, the evaluation Research Plan included a goal of 600 participant phone surveys targeting those customers who experienced an increase in energy use after participating in the PY2011 ESA Program. CIC Research fielded the survey in April 2013, completing 602 surveys. Table 39 shows the number of survey respondents by IOU.

Table 39: PY2011 Program Participant Phone Survey Respondent Count by IOU

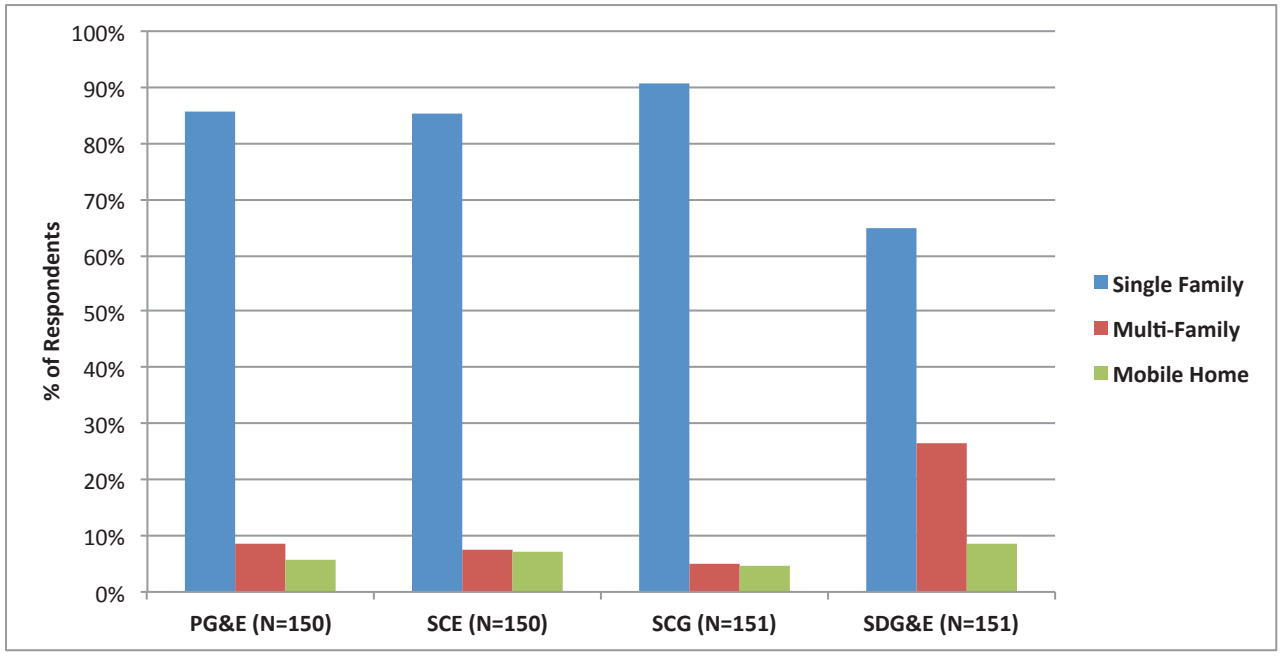
PG&E	SCE	SCG	SDG&E	Total
150	150	151	151	**602**

Below is a summary of selected participant responses to the survey.

5.2.1 Home Characteristics

Figure 18 displays the percentage of respondents by housing type by IOU. Between 85 and 90 percent of respondents were from single-family households, except for SDG&E (65 percent). Likewise, multi-family homes were responsible for between 5 and 10 percent of all phone surveys, except for SDG&E (26 percent), with mobile home respondents providing the rest of the responses.

Figure 18: Housing Type



To determine whether or not landlords (rather than the participants themselves) were responsible for paying the utility bills, several questions were asked regarding home ownership and bill payment. If landlords are paying the utility bills rather than the tenants, then participants that are renters will have little incentive to conserve energy and might be more likely to increase energy consumption after participating in the ESA Program.

To explore this possibility, participants were first asked if they rent or own their homes, and more than 70 percent of respondents stated that they own their home. Of those respondents who rent, almost 95 percent said their landlords do not pay utilities. These responses together indicate that having landlords (rather than tenants) paying the utility bills is not especially prevalent in the ESA participant population that experienced increases in energy use. Consequently, having landlords paying the utility bills is unlikely to be a factor in the increased energy use observed in the post-participation period. See Figure 19 and Table 40 for more detail on responses to these questions.

Figure 19: Responses to "Do you own or rent your home?"

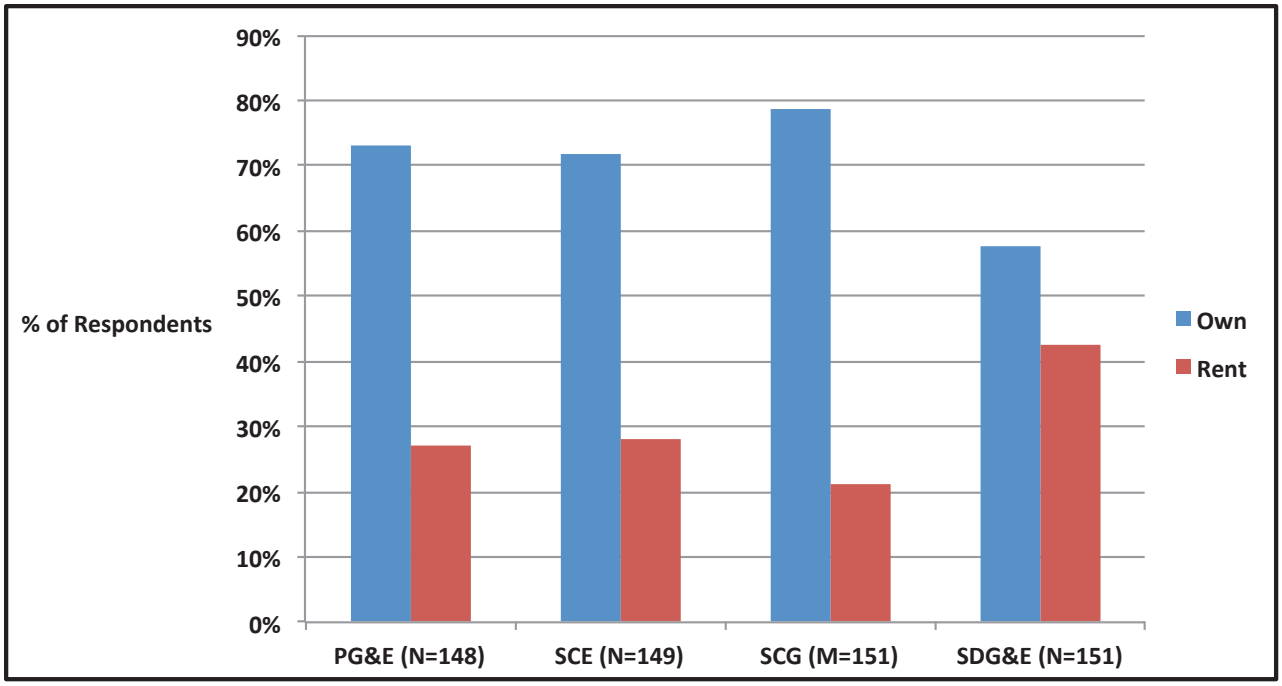


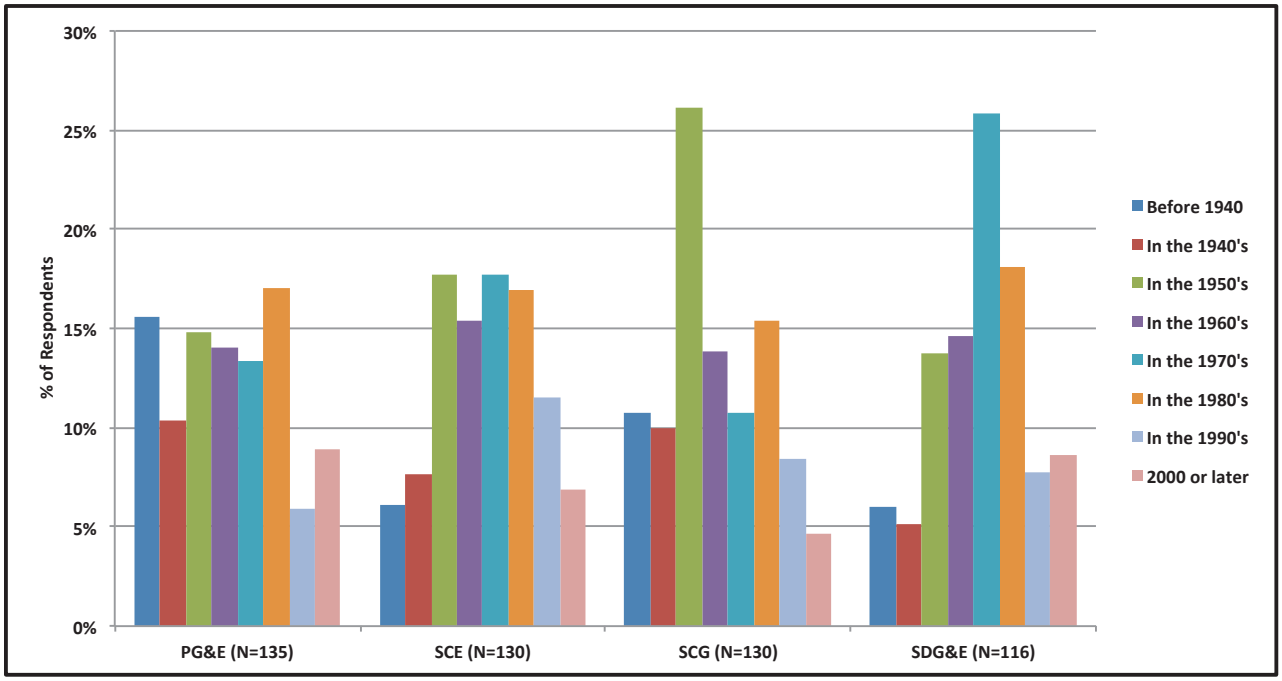
Table 40: Responses to "Does your landlord pay for any portion of the electric and gas utilities?" (asked of renters only)

	PG&E (N=40)	SCE (N=42)	SCG (N=32)	SDG&E (N=63)	Total (N=177)
Yes	5%	7%	6%	5%	6%
No/Other	95%	93%	94%	95%	94%

Figure 20 displays the average response for when homes where built. The majority of homes were built between 1950 and 1989, with less than 10 percent of the response for any decade outside of this

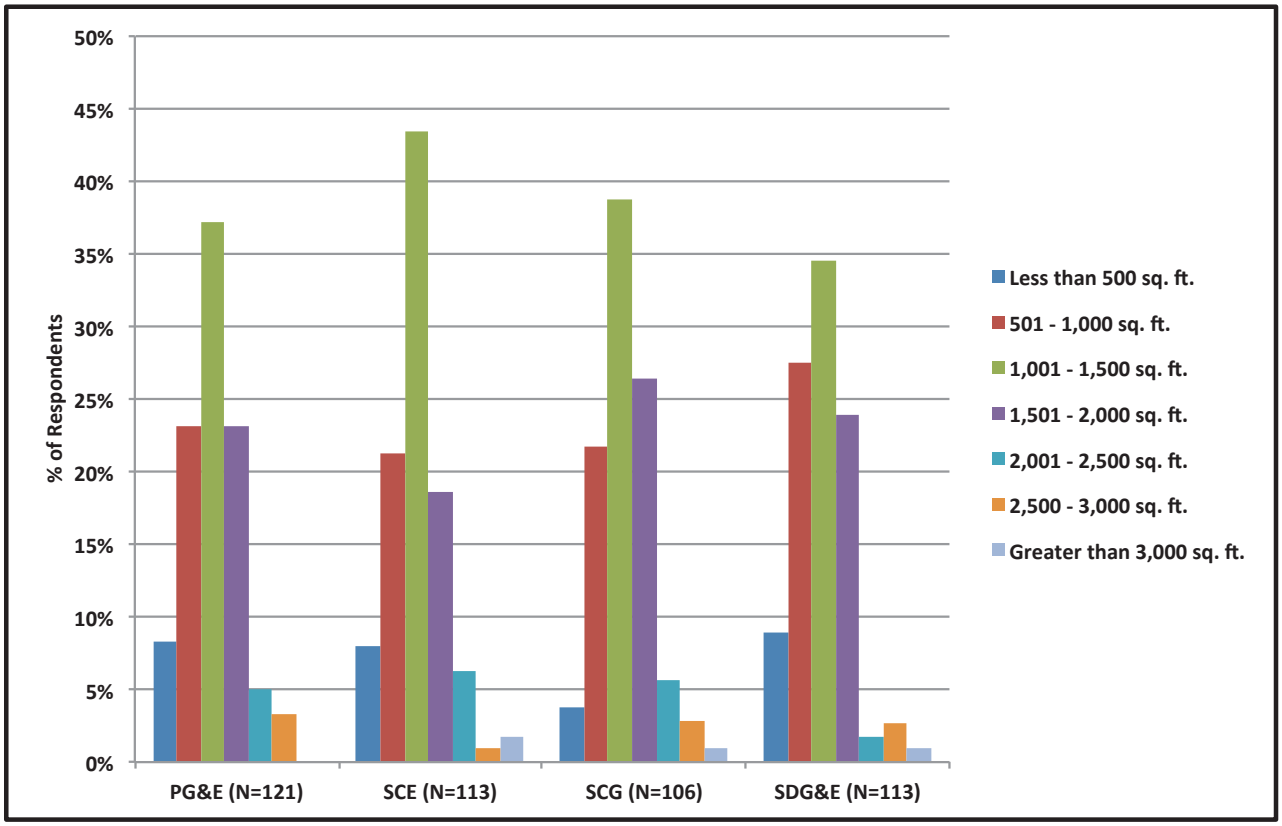
range. PG&E customers had the oldest homes, 16 percent built before 1940, while SDG&E respondents tended to have the newest, 60 percent of homes built after 1970.

Figure 20: Home Vintage



As illustrated in Figure 21, most homes are between 1,000 and 1,500 square feet (38 percent) and this size distribution is fairly consistent across IOUs. Less than 15 percent of respondents live in homes that are smaller than 500 square feet or homes that are greater than 2,000 square feet.

Figure 21: Home Square Footage



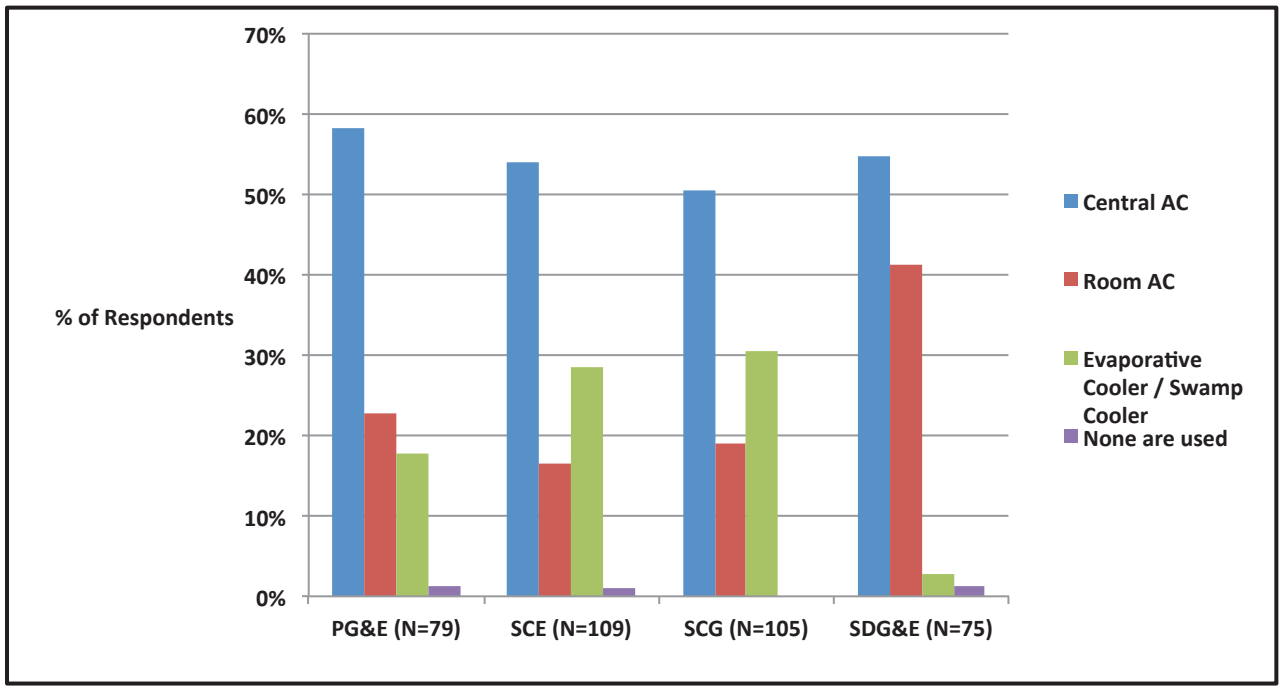
5.2.2 Home Cooling

A series of questions were asked about cooling to determine whether or not increases in home cooling might be driving the overall increase in energy use. Table 41 illustrates that, of those surveyed, 61 percent stated they have an air conditioner or an evaporative cooler in their home. These respondents were then asked a follow-up question on the primary type of air-conditioning they use. As shown in Figure 22, the majority of these responses (54 percent) use central air conditioning as their primary source, with lesser numbers reporting using evaporative coolers or room air conditioners.

Table 41: Responses to "Do you have an air conditioner, evaporative cooler or swamp cooler in your home?"

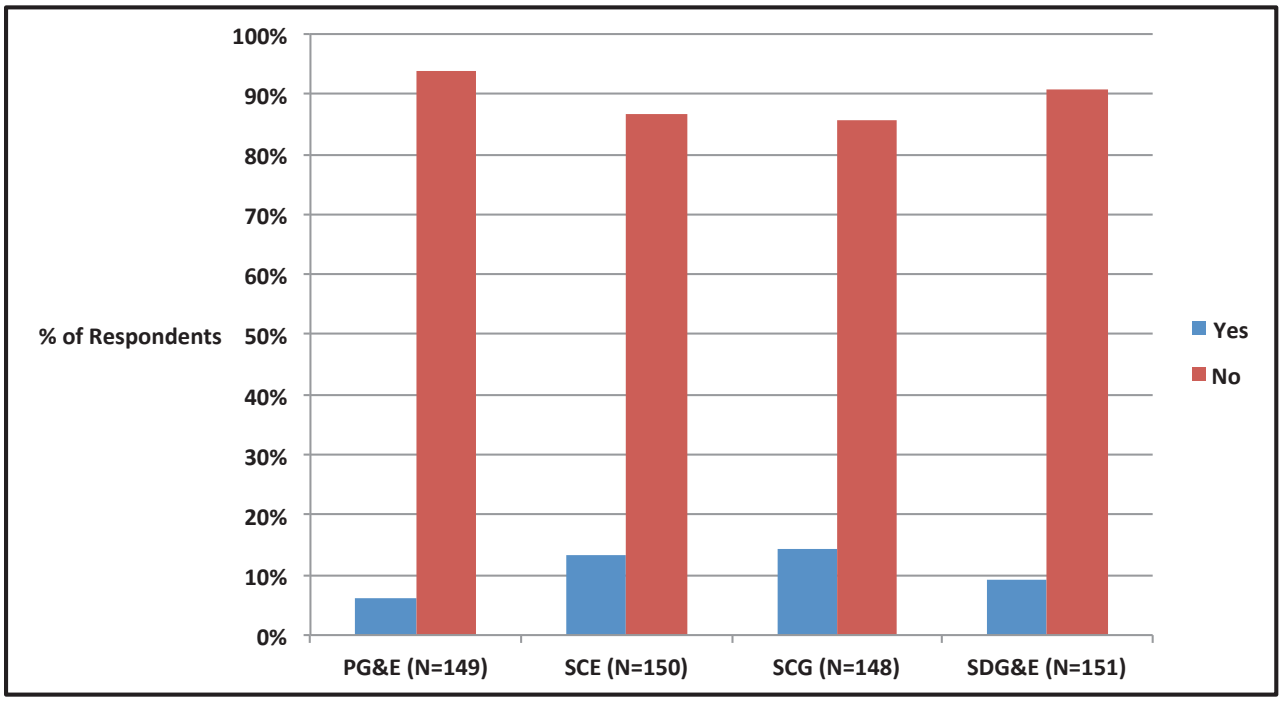
	PG&E (N=150)	SCE (N=150)	SCG (N=151)	SDG&E (N=151)	Total (N=602)
Yes	53%	73%	70%	50%	62%
No/Other	47%	27%	30%	50%	38%

Figure 22: Response to "What type of air conditioning do you use primarily?"



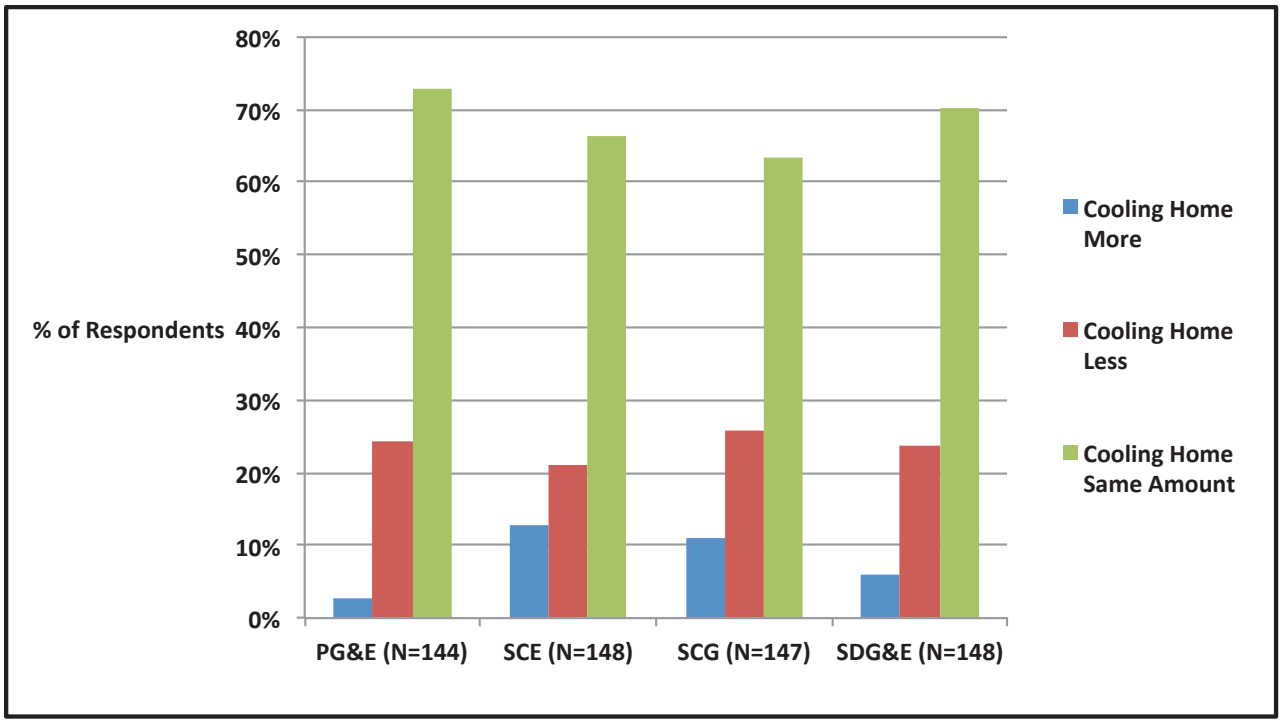
When asked if participation in the ESA Program caused a change in the way they cool their home, only 11 percent of respondents said "Yes," as illustrated in Figure 23. It would appear, then, that while energy usage may have changed after ESA Program participation, the primary equipment used for cooling largely did not. The majority of participants continued to use the same primary method of air conditioning to cool their home, even if new equipment was installed through the ESA Program.

Figure 23: Responses to "Did your participation in the ESA Program cause you to change the way you cool your home?"



In addition to continuing to use the same method for cooling their homes, Figure 24 shows that the majority of respondents stated that they cool their homes either the same amount or less than before participating in the ESA Program. Because each of those surveyed had increased energy usage after participation, we assume that this increase is not due to changes in participant home cooling.[34]

Figure 24: Responses to "Since you participated in the ESA program, would you say you are cooling your home more, less or the same?"



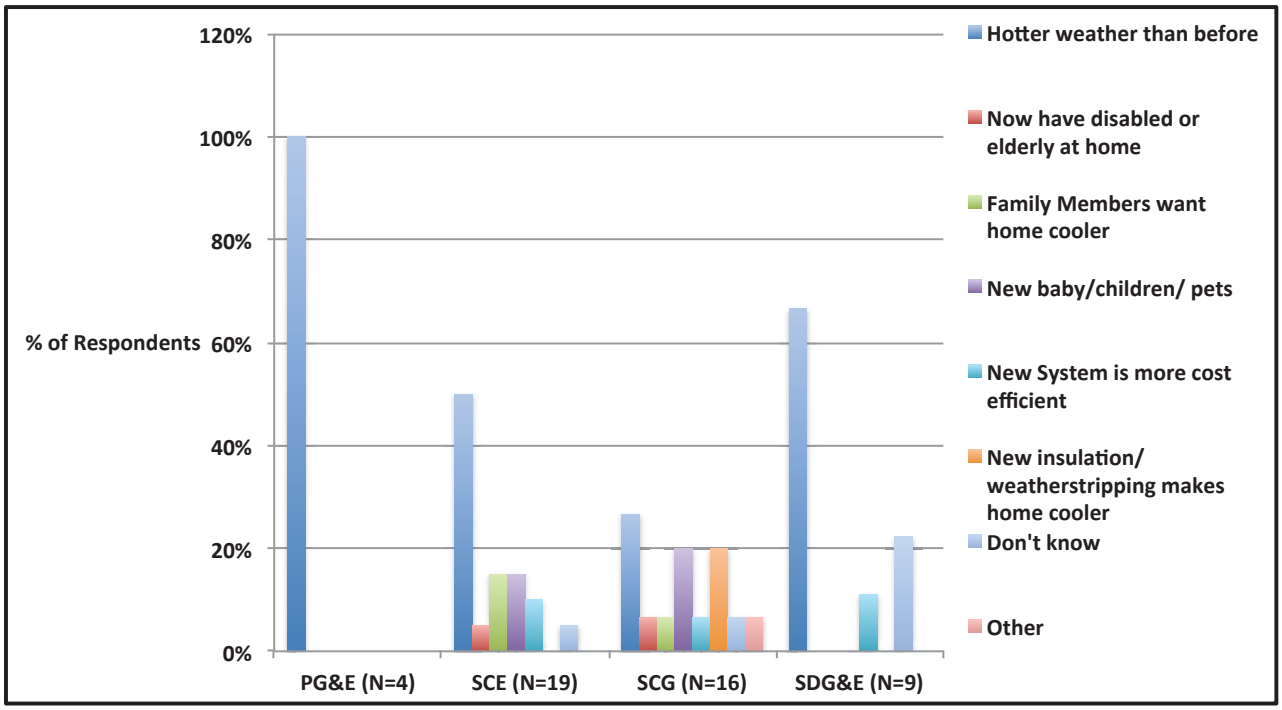
Of the small percentage of participants who claimed to be cooling their home more since participating in the ESA Program, half say they are doing so because of warmer weather. Other responses included that, they had a new child or pet in their home, or they simply wanted their house cooler. Some claimed it was because the new cooling system was more cost efficient.

For those respondents that indicated that they cooled their home more since participating in the ESA program, very few received cooling measures through the ESA Program. Of the 26 respondents (four percent of the total survey sample) that indicated that they cooled their home more, only one respondent received a cooling measure (e.g., Central AC, Room AC, Evaporative Cooler) through the ESA Program, based on analysis of program tracking data for these customers. This suggests that receiving a cooling measure through the ESA Program by itself is unlikely to be a significant driver in

[34] The survey respondents' monthly energy use was also examined to determine if the increase in energy use after program participation was seasonal in nature. After comparing the month-over-month energy use for the survey sample, there was no discernable seasonal pattern that would indicate the change in use was due to increased heating or cooling. This finding is consistent with the survey responses regarding heating and cooling behavior since participating in the program.

the observed increase in energy consumption. The sample size for this question is very small, however, and these results are not statistically significant.

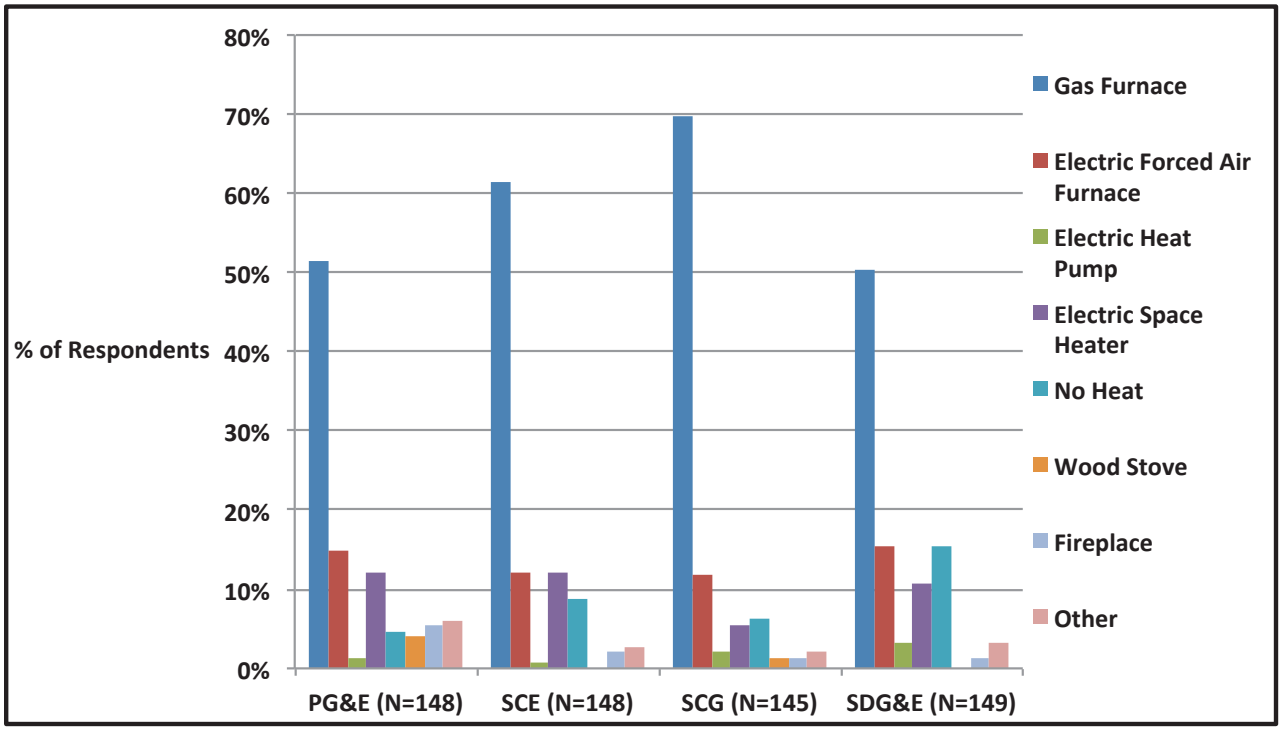
Figure 25: Responses to "Why are you cooling your home more now?"



5.2.3 Home Heating

Participants were also asked about the primary method used to heat their home. As shown in Figure 26, 58 percent of survey respondents named a gas furnace as the primary source of home heat, 14 percent an electric forced air furnace, and 10 percent an electric space heater.

Figure 26: Responses to "Which of the following best describes the primary way you heat your home?"



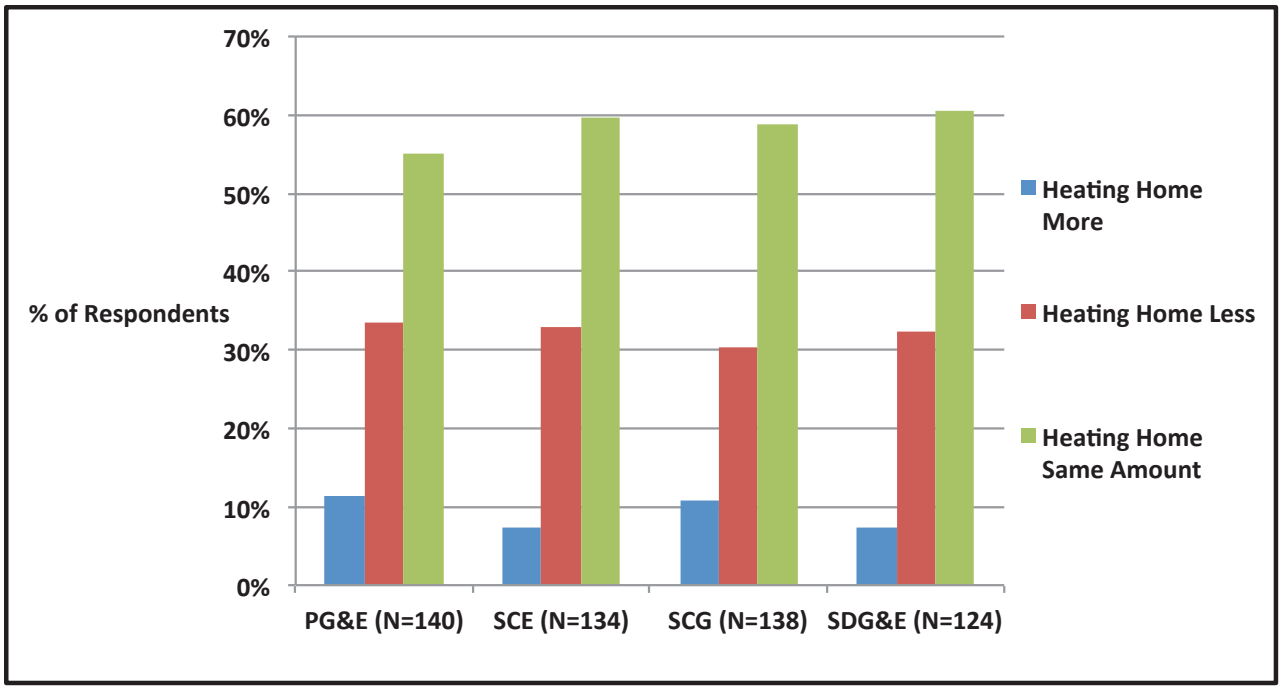
As was true for home cooling, the majority of participants (88 percent) stated that they did not change the way they heat their home as a result of participation in the ESA Program (see Table 42). This indicates that energy usage increases were generally not caused by changes in participant home heating.

Table 42: Responses to "Did your participation in the ESA Program cause you to change the way you heat your home?"

	PG&E (N=142)	SCE (N=135)	SCG (N=142)	SDG&E (N=128)	Total (N=547)
Yes	13%	13%	11%	10%	12%
No/Other	87%	87%	89%	90%	88%

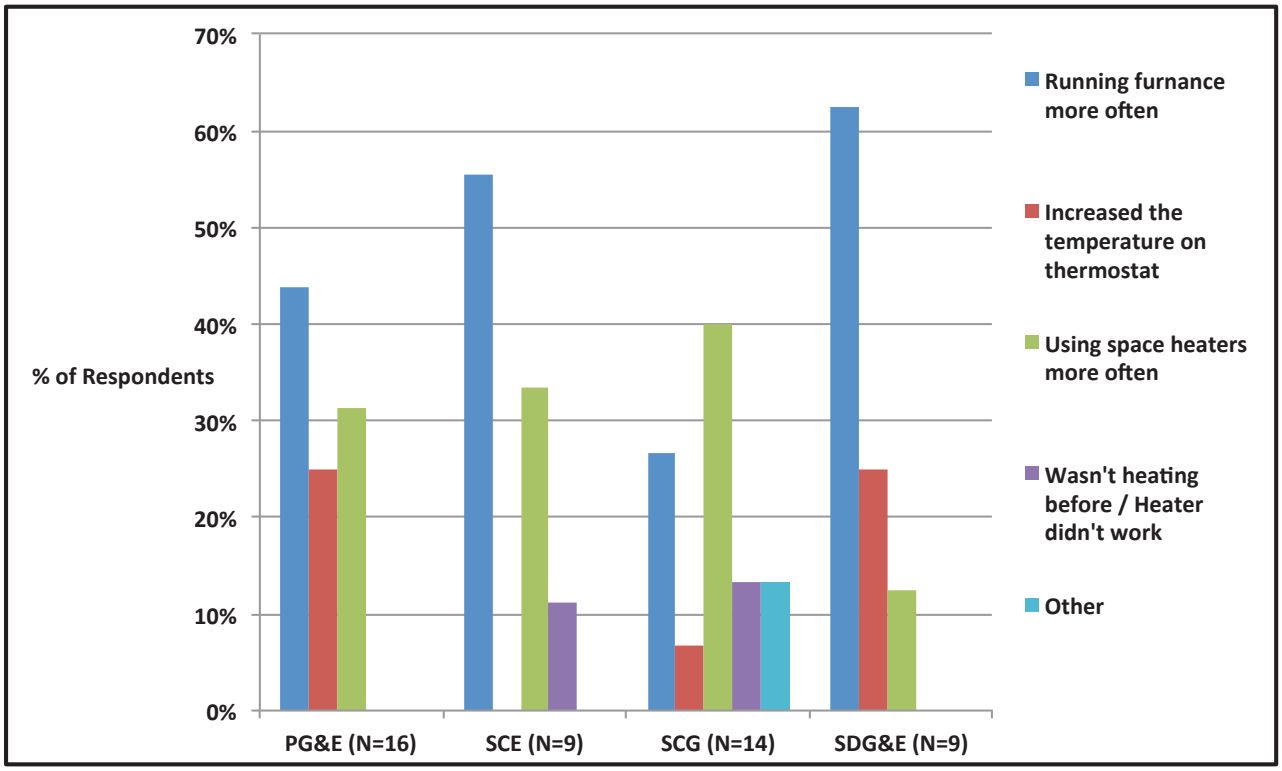
As shown in Figure 27, the vast majority of participants (91 percent) claim to heat their home either less or about the same as before ESA Program participation.

Figure 27: Responses to "Since you participated in the ESA Program, would you say you are heating your home more, less or about the same?"



Of the 48 respondents who claimed to be heating their home more now than before participating in the Program, the largest group (44 percent) said that they are running their furnace more often. Others say they are using space heaters more often (31 percent) or have increased the base temperature on their home thermostat (15 percent). Figure 28 shows the breakout of all responses by IOU. This subsample of respondents is small, however, and these results are not statistically significant.

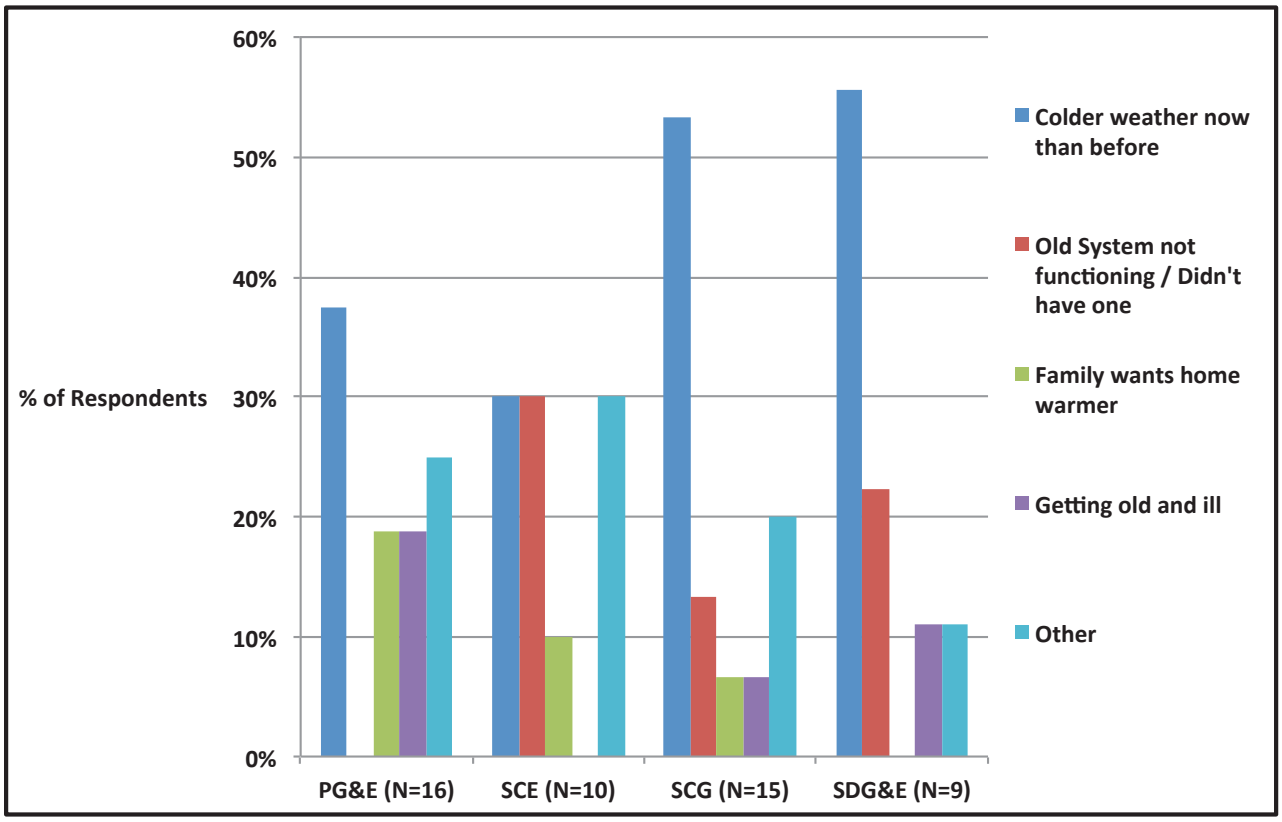
Figure 28: Responses to "How are you primarily heating your home more?"



As seen in Figure 29, among those 48 respondents who claimed to heat their home more post-participation, the largest group (44 percent), attribute this behavior to colder weather. Others suggested that their old equipment was not in working condition, family members just want their home warmer, or that they needed a warmer home as they aged. Again, these responses are from a very small sample size and are not statistically significant. However, they do provide anecdotal evidence that there is not a single factor driving the increase in heating for these customers.

For the fraction of respondents that indicated that they heated their home more since participating in the ESA program, only a few received heating measures through the ESA Program. Of the 50 respondents that said that they were heating their home more since participating in the program (eight percent of the total survey sample), only 16 respondents also received a heating measure (e.g., furnace repair, replacement, or tune-up) through the ESA Program. This suggests that using a program-supplied heating measure is unlikely to be a major driver of the observed increase in energy consumption.

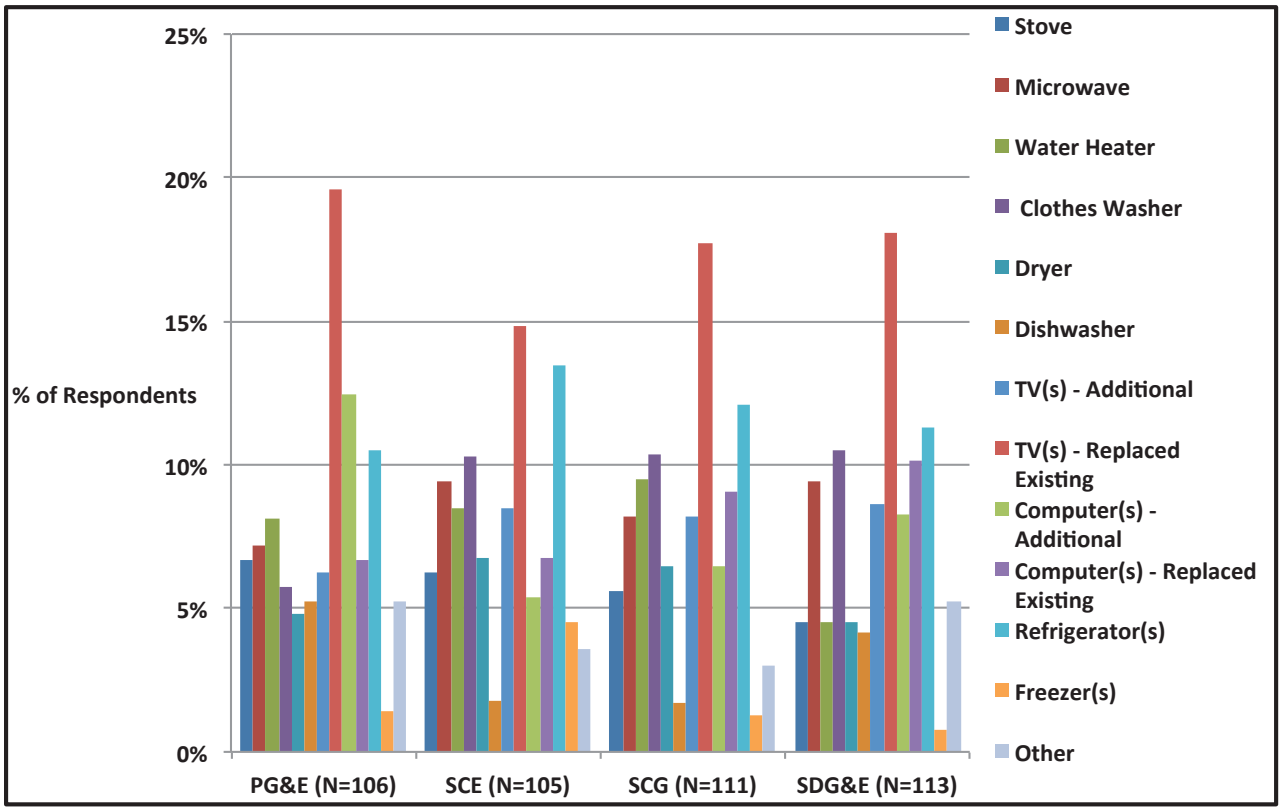
Figure 29: Responses to "Why are you heating your home more now?"



5.2.4 Added or Replaced Items in Home

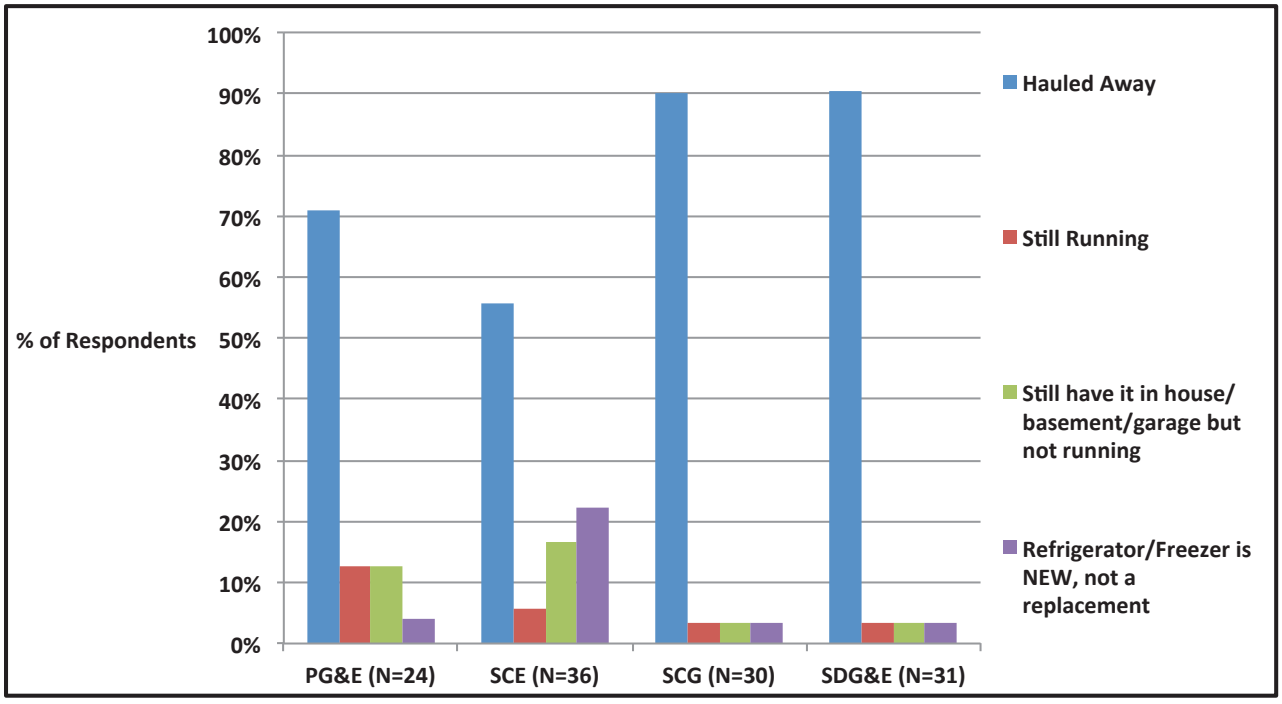
To better understand why their energy usage changed after the participation in the ESA Program, survey respondents were asked what equipment was either added to or replaced in their homes since Program involvement. As shown in Figure 30, the most common new equipment added or replaced by participants were stoves, microwaves, water heaters, clothes washers, dryers, TVs, computers and refrigerators.

Figure 30: Responses to "Since your involvement with the ESA program, have you added or replaced any of the following items to your home?"



For those who had installed new refrigerators/freezers, a follow up question was asked to determine what was done with the old appliance. As shown in Figure 31, 76 percent of participants who replaced their refrigerators/freezers stated that the equipment was hauled away and no longer running in their homes. Having the old equipment removed is a requirement for the ESA Program, but it is possible that these respondents had their equipment replaced outside the program. The small number reporting that they kept their old appliance suggests that adding a new refrigerator or freezer and keeping the old one is unlikely to be a factor driving the increase in energy consumption.

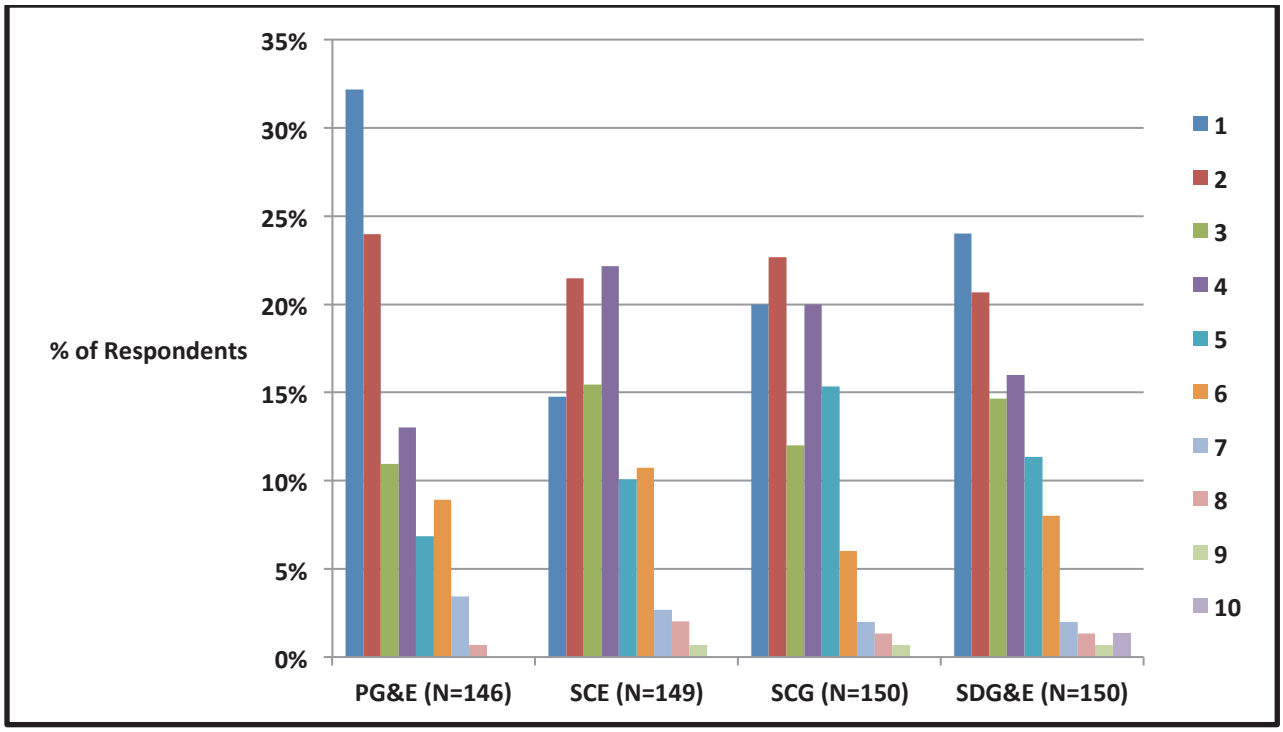
Figure 31: Responses to "Did your old Refrigerator / Freezer get hauled away, or is it still running somewhere in your house, basement, or garage?"



5.2.5 Change in Number of People in Home

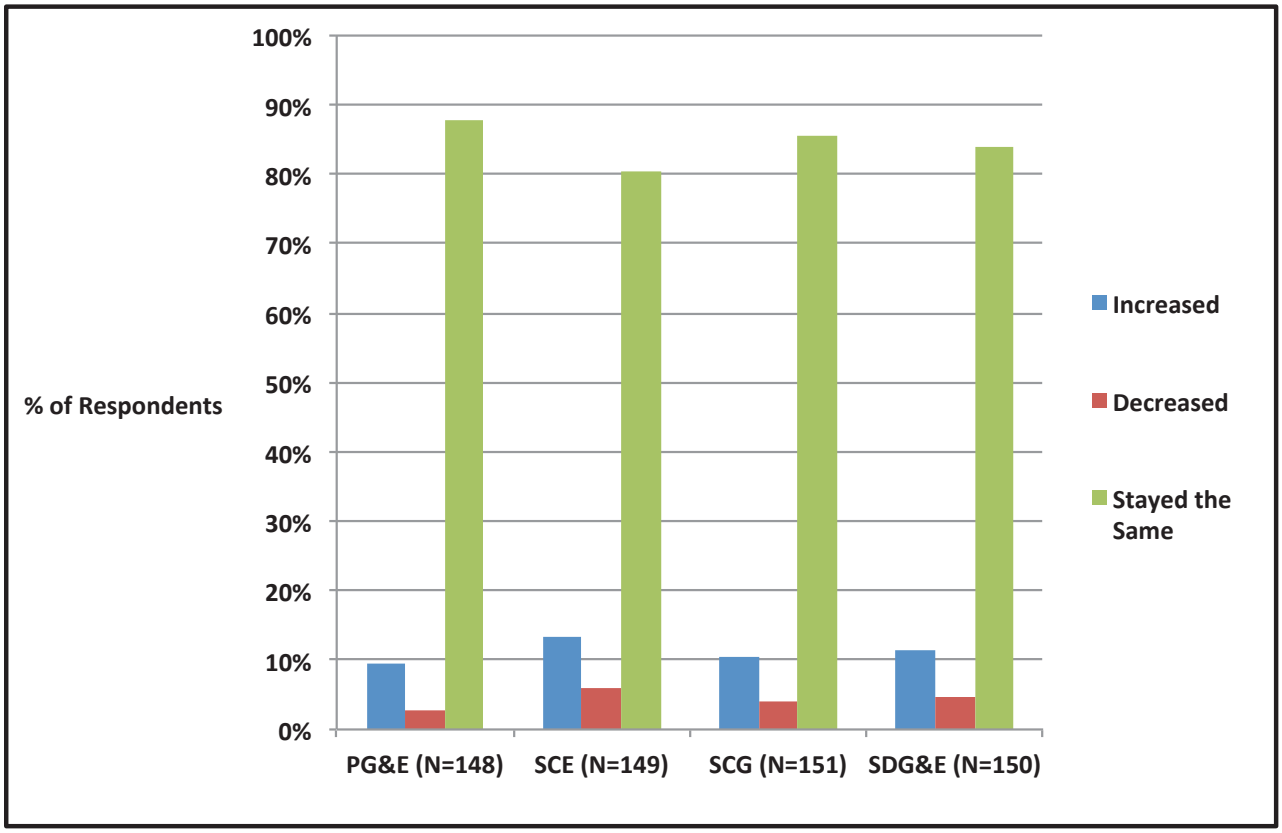
Several questions were also asked about the number of people living in the home, as occupancy is a key determinant of energy use, and increases in occupancy could be an important cause of increased energy use. Based on the survey responses, the average household surveyed had 3.2 people living in their home at the time of the interview. Figure 32 displays the number of people in each household by utility. Aside from SCE respondents, most homes are occupied by one or two people.

Figure 32: Responses to "How many people currently live in your home?"



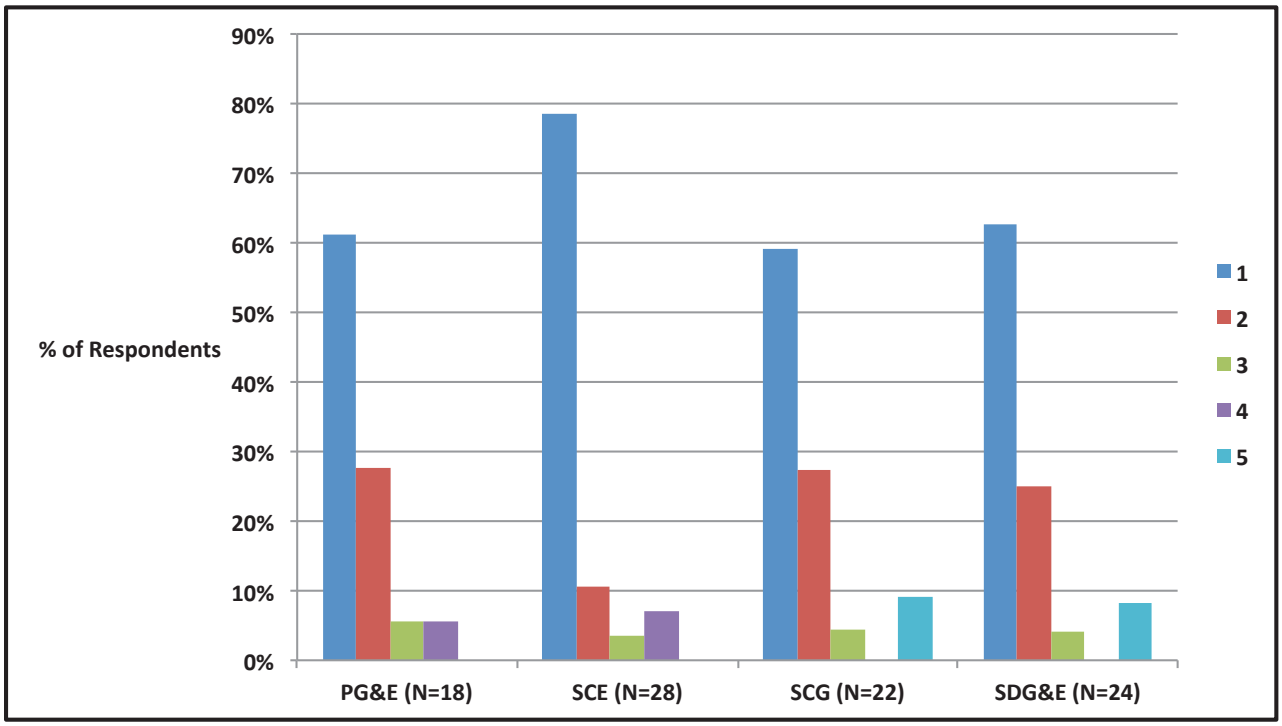
Respondents were asked if the number of people living in their homes had changed since participating in the ESA Program. As shown in Figure 33, the majority of participants stated that the number of people in their home had stayed the same (85 percent), while only about 10 percent indicated that the number of people living in the home had increased.

Figure 33: Responses to "Has the number of people living in your home changed since you participated in the ESA program?"



Of those respondents who stated there was a change in the number of people living in their homes, over 85 percent said the change was by only one or two people. Note that of those who stated a change (16 percent of the entire survey sample), 72 percent said they had an increase in the number of people in the household and 28 percent said the number had decreased. See Figure 34 for additional detail by utility.

Figure 34: Response by IOU to "By how many did your household increase/decrease?"



Respondents were asked if the number of people who stay home during the day had changed, as this can have a significant impact on energy use. Most respondents indicated that the number home during the day had either stayed the same (86 percent) or decreased (4 percent). For the 10 percent of the survey sample that said there was an increase in the number of people at home during the day, most said the change was only by one or two people. Figure 35 and Figure 36 illustrate these responses.

Figure 35: Response by IOU to "Has the number of people that stay at home during the day changed since you participated in the ESA Program?"

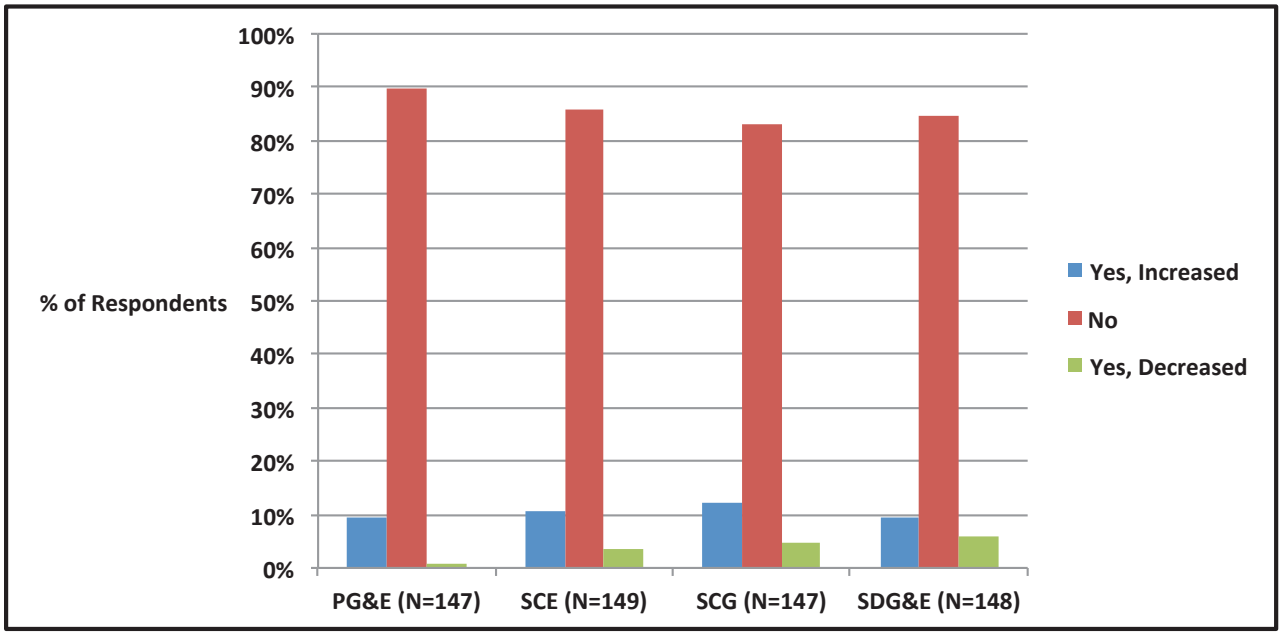
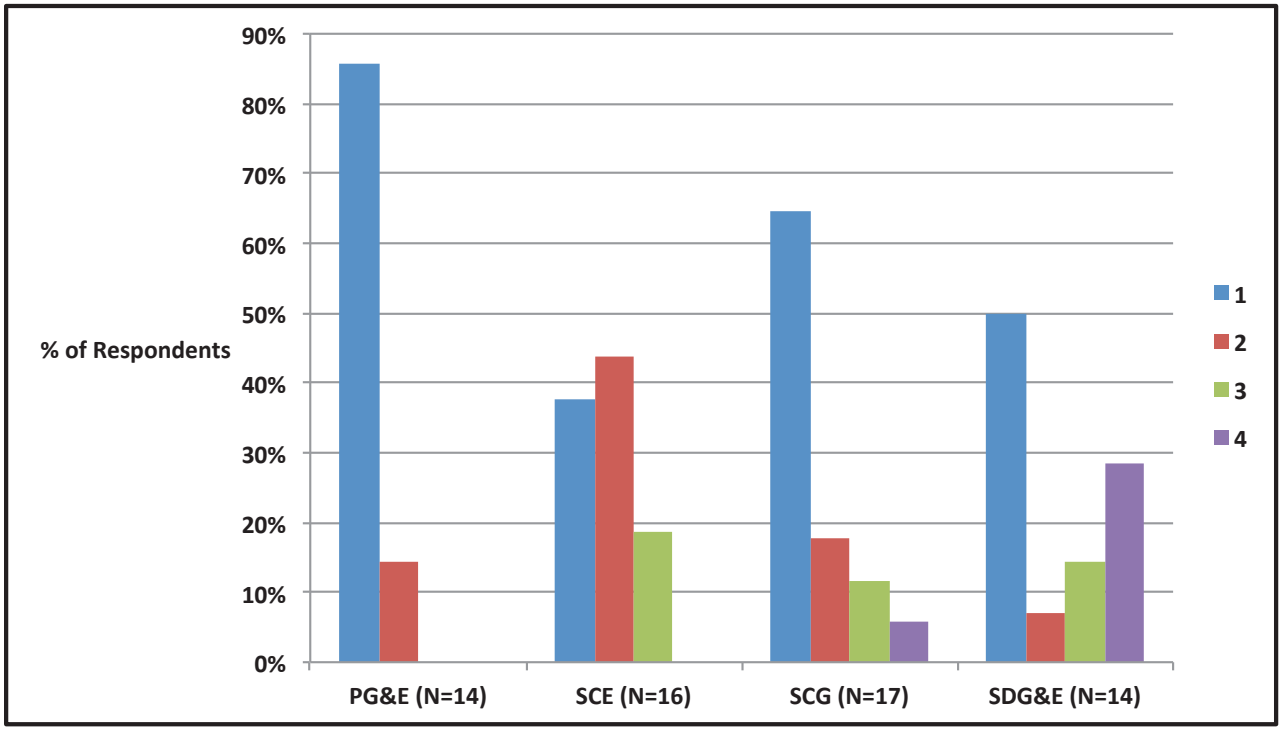


Figure 36: Response by IOU to "How many more people stay at home during the day since you participated in the ESA Program?"



5.3 Phone Survey Results Summary

Despite covering all of the topics that would reasonably be expected to contribute to an increase in energy use, the survey was unable to identify a clear driver for increased energy use. General findings from the phone survey include the following:

- **Respondents indicate that there is generally no increase in the amount of cooling in their homes.** About 92 percent indicated that there was no change in how much they cooled their home (or that they cooled their home less) after they participated in the program.
- **Similarly, respondents indicated that there was no increase in how much they heated their home.** When asked the same question regarding heating, 91 percent of respondents indicated that there was no change in how much they heated their home (or that they heated their home less) since they participated in the program.
- **Increases in heating or cooling attributed to weather.** For the small fraction of respondents that indicated they increased their heating or cooling, the most common reason given was due to weather (50 percent for hotter weather, 44 percent for colder weather). Note that weather is the one factor that we can control for in the billing regression model. The remaining responses were distributed across multiple reasons, with no clear trends apparent.
- **Vast majority of respondents pay their own utility bills.** Most of the respondents own their home, and among the remaining renters 95 percent pay their own utility bills. This indicates that having the landlord (rather than the tenants) paying the utility bills is unlikely to be a cause of the increased energy use.
- **Heating and cooling measures obtained through the ESA Program do not seem to be contributing to increased energy use.** Of the small subsample that indicated an increase in heating or cooling use, only a small fraction of this group received heating and cooling measures through the program. Given these small numbers, it does not appear that increased use of measures obtained through the ESA Program is a significant factor in the increase in energy use observed in the post participation period.
- **Additional appliances added to homes, but unlikely to be a significant driver in increased energy use based on the types of appliances added.** The majority of respondents (72 percent) indicated that they had added at least one new appliance to their household, although some of these were installed through the program and therefore would be expected to save energy (assuming that they were replacing a functioning existing unit). The most commonly cited appliance addition was a new TV that replaced an existing TV (37 percent). Other frequently mentioned appliances included refrigerators (25 percent), clothes washers (20 percent), computer (17 percent), and water heater (16 percent). Given that these measures are likely replacing existing measures that presumably are less efficient, it is unlikely that the new appliance purchases can explain the increased energy use observed in these homes.
- **Little change in occupancy among surveyed homes.** Across utilities, only 11 percent of respondents indicated that the number of people in the household had increased since participating in the program. Among these households, the majority (66 percent) only had one additional person staying in their home, and 22 percent had two additional people. Similar responses were observed for questions relating to changes in how many people remained home during the day. The low occurrence of additional people suggests that this is unlikely a significant factor in the increase in energy use observed for the ESA participant population.

The overall conclusion to be drawn from the survey results (and the examination of energy use trends discussed earlier) is somewhat disappointing; households often appear to be using more energy after participating in the ESA program, but it is unclear why this increase is occurring. While respondents indicate that increases to heating and cooling use are due to changes in weather, the fact that usage has increased even when weather has been accounted for (e.g., usage for the survey sample is examined on a per-CDD and per-HDD basis to take into account changes in temperature) indicates that something else is occurring that drives energy consumption.

6 Conclusions and Recommendations

Based on the ESA Program impact evaluation for PY2011, the evaluation team offers the following analysis conclusions and recommendations.

6.1 Conclusions

General conclusions that can be drawn from the impact analysis results include the following.

Savings from the ESA Program measures is a small fraction of overall household energy consumption. Savings from the ESA program on average ranges from three to nine percent of overall energy consumption. This low level of savings makes developing savings estimates (particularly at the measure level) particularly challenging. These challenges are compounded by the wide array of external factors that can influence energy use. As discussed throughout the report, the small amount of program savings is sometimes overwhelmed by these other non-program factors in the billing regression and result in estimates of no savings or increased energy use for some measures.

The final impact estimates are generally consistent with the *ex ante* savings values. The final recommended impact values for both electric and gas measures resulted in total household savings that were fairly close to the original *ex ante* savings values. For electricity, household realization rates ranged from 80 to 110 percent of *ex ante* savings. For gas, realization rates ranged from 92 to 119 percent. Note that this consistency with the *ex ante* values is due in part to how the final impact numbers were assigned from either the regression models or *ex ante* values. Since the *ex ante* values were used as the final impact estimates in cases where the regression models did not produce a reliable estimate, the potential for differences with the *ex ante* values was naturally reduced.

The impact estimates deviate from the previous evaluation and from DEER values. For electric measures, estimated savings in the current evaluation are lower than estimates from PY2009, while gas estimates in the current evaluation are significantly higher. In the case of the gas savings, this may be due to significantly more heating degree days in the current evaluation relative to the last. The current impact estimates are within the range of those observed in previous evaluations going back to 2001, however, as there is substantial variation in household savings estimates over the years. The current evaluation estimates were also different from DEER values for the same measures, although no trend of being consistently higher or lower than DEER at the measure level was observed.

Impact estimates will naturally vary across years due to a variety of factors. Differences across customer groups in terms of energy use, geographic location, measure mix, demographics, economic situation, and condition of the home will all lead to differences in impact estimates for the ESA Program. We should not expect these estimates to be the same across time or across service territories due to the large number of potential influencing factors. In the current evaluation, differences from the prior evaluation may also be due to the utilization of a different regression model and data screening process. While identifying these influencing factors is straightforward, determining the relative importance of each of these factors on the change in savings values between years is not possible without significantly more evaluation resources being devoted to making a detailed comparison of participation patterns between years. Given that the primary objective of this impact evaluation is to develop savings estimates for the current program year, this more detailed analysis was not attempted beyond the comparisons presented earlier in this report.

A significant number of ESA Program households are using more energy after participation. Despite the new measures and energy education received through the program, a significant number of households were found to be consuming more energy after program participation. For electricity, more than half all of all participants exhibited weather-normalized increases in energy use during either heating or cooling periods. Similarly, approximately 60 percent of gas participants increased their gas consumption in the post-participation period. Because this increase appears to be independent of weather, it is especially challenging to address in the billing regression and may lead to biased impact estimates. The phone survey did not provide any additional information as to what might be causing this increase in energy use. Since the vast majority of participants were already on the CARE rate prior to ESA enrollment, it is unlikely that the lower CARE rate is a factor in increased energy use for the time period examined.

Whole house impacts estimated from the household-level regression models produced lower estimates. The results from the Whole House fixed effects models that estimate total savings (rather than savings for individual measures) produced generally lower house-level savings values than simply aggregating up the measure-level savings from the Basic and Measure Models. This is due in part to the ability with the Basic/Measure models to remove impact estimates showing an increase in energy use and replacing them with the *ex ante* values, which by definition will increase the overall savings estimate. Since measure-level detail is not available in the Whole House model, it is not possible to make these post-model adjustments.

While it was hoped that having a whole house variable for savings would help address the possibility of collinearity among the measure variables, this advantage appears to have been outweighed by a lower ability to disentangle the program effects from other factors influencing energy consumption. This is particularly challenging given the number of homes observed to have an increase in energy use in the post-participation period (particularly with PG&E). Given this context, it is not surprising that the Whole House model (which utilizes less program information) produces lower savings estimates than the Basic Model that utilizes more information on what was installed through the program.

Customers may be unaware that they are using more energy. The phone survey targeting households with increased energy use did not provide any clear answers on what might be driving the increased consumption. Respondents generally reported that they were using their heating and cooling systems about the same as they did prior to participation. For those that said they used the systems more, the most common reason for using heating and cooling systems more had to do with changes in weather (e.g., hotter or cooler weather). As shown in the analysis of weather-normalized energy use, changes in weather are not sufficient to explain all of the increase in usage. Other factors, such as having more people home during the day, did not appear to be a significant factor in explaining increased use. While participants have been adding new appliances to their homes, these appear mostly to be replacing older units and therefore should be using less energy. These findings raise the possibility that – despite the new measures and energy education – consumers are using more energy and (perhaps more importantly) they are unaware that they are consuming more energy. The issue of whether they were truly unaware was not explored directly in the phone survey, however.

6.2 Recommendations

From the evaluation conclusions, we offer the following recommendations for the ESA Program.

Continue using billing regression to estimate program impacts. Despite some of the challenges discussed in this report, we recommend that the fixed effects billing regression model continue to be used to estimate impacts for the ESA Program using data from the participant population. The fixed effects model provides a means for producing statistically reliable and unbiased estimates of savings that account for both differences across households and time periods.

For future impact evaluations utilizing a billing regression, developing multiple model specifications provides more flexibility. If billing regression is to be used in future ESA Program evaluations, we recommend an approach that combines results from the Basic and Measure Model specifications presented here. While this does rely on evaluator judgment to make some impact assignments, the approach is ultimately more flexible than relying on the results of a single model. In the current evaluation, having multiple models resulted in impact estimates for some measures that could not have been provided using the Basic Model alone.

If variations in impact estimates over time are not acceptable, consider using DEER deemed values to estimate savings. The wide swings in savings estimates – both across utilities and evaluation time periods – has raised concern among some reviewers. Possible reasons for these discrepancies have been discussed in the last two impact evaluations, and variations will continue in the future. It is also stressed again here that the exact cause of these differences will likely remain unknowable without an enormous data collection effort that collects statistically representative data on home and customer demographics within each utility service territory by housing type, climate zone, and possibly additional household characteristics such as family size and home vintage. Short of a massive data collection effort, the root causes of energy savings variation across utilities and program years will likely remain unknowable.

As argued in this report, we do not believe that the variation in savings estimates is necessarily a bad thing. Nevertheless, if more consistency in the impact estimates is desired, then using deemed savings values from DEER in place of a billing regression should be considered. This deemed approach will reduce uncertainty with respect to savings estimates across utilities within a program year, as well as produce more stable savings estimates across program years. Using DEER, however, does not allow for the possibility that the low-income population is significantly different in terms of energy savings relative to the general population. While testing this theory is beyond the scope of this project, it may be worth reducing the uncertainty in savings estimates by using DEER even if that database is not an entirely accurate representation of the savings achieved in the low-income sector.

Weather variables should be calculated using hourly (rather than daily) temperature data. The calculations of CDD and HDD using hourly temperature data allow for a more accurate representation of days that heating or cooling equipment might be used. In this evaluation, the hourly method resulted in significantly more cooling degree days and only slightly more heating degree days then the traditional daily method. Given that the hourly method is more accurate and easy to calculate, we recommend that it be used for future impact evaluations of the ESA Program.

Allow more time for the impact evaluation. The time allocated for this evaluation was very short (six months), with a research plan finalized on March 18 and a final report produced by August 31. The previous impact evaluation, by comparison, required 20 months to complete. While the impact evaluation was completed in the time allotted, this was accomplished by having a very focused approach that did not allow for exploring additional research questions when they arose. For example, more time might have allowed for additional analysis of the survey data, or even a short

follow up survey to explore other aspects of energy use that might have shed more light on increased energy consumption. Similarly, there was not enough time to conduct a more in-depth comparison of the impact estimates between the 2009 and 2011 evaluations to determine how changes in participation patterns, measure mix, and weather might have contributed to differences in impact estimates between the two years. Adding three to six months to the impact evaluation timeline would allow for a more in-depth and flexible approach that provides more insights into the ESA Program savings estimates.

Conduct a more rigorous analysis of participation patterns across evaluation years. As mentioned above, the current evaluation did not have enough time to conduct a rigorous comparison of participation patterns between PY2009 and PY2011. While this evaluation did provide some information on weather conditions and participation across climate zones between the two evaluation years, the primary focus was in developing defensible savings estimates for the current evaluation year. Additional analysis on changes in participation patterns in terms of measure mix, housing type, energy use, weather conditions, and geographic distribution would likely provide additional insights as to the factors driving the variation in savings estimates across program years. We recommend additional time and budget be allocated for this analysis in the next ESA Program impact evaluation.

Continue with current evaluation cycle timing. The last several impact evaluations have focused on a single program year and have occurred every 2-3 years, and we recommend that this cycle continue in future years. Given that the savings levels will change regularly due to weather, measure mix, and participant characteristics, the evaluation should also be conducted at regular intervals in order to reflect this variation. This is especially important when the impact evaluation results are used to set the *ex ante* savings values for future program years. If impact evaluations are done less often, or are done for multiple evaluation years combined, then some of the inherent variability will be lost due to the timing and structure of the impact evaluation. This may result in less accurate impact estimates moving forward, particularly if the market is shifting and the programs are locked in to using fixed impact estimates for a longer period of time until a new impact evaluation can be completed. Having the evaluations done more often (instead of every five years, as has been suggested) will provide flexibility to adjust the energy savings estimates as needed to reflect changing demographics and market conditions.

Remember lessons from previous evaluations. Finally, a couple of issues were raised by reviewers relating to analysis methods that were explored in the previous impact evaluation. These are methods that were recommended by reviewers of this current report as possible methods to use in the future:

- **Billing regression using additional survey data.** A common approach for obtaining additional customer information for use in a billing model is to conduct a phone survey of program participants that asks detailed questions about their home and factors that may have changed since participating in the program. This approach was used in the PY2009 ESA impact evaluation but did not yield useful impact results. While in theory it might be valuable to have survey data that provides additional explanatory variables in the billing regression, in practice this did not result in an improved billing model in the PY2009 evaluation. Consequently, we do not recommend this approach for the billing regression in future evaluations and instead recommend that the billing models rely on the ESA participant population.

- **Billing regression using on-site data.** Customer on-sites can be used to collect additional information on home characteristics that can be used as additional variables in a billing regression model. This method was also used in the PY2009 impact evaluation and did not provide credible impact estimates. The on-sites are also expensive to conduct, especially if a large enough sample is needed to be representative for a billing regression. We also do not recommend conducting on-sites in future ESA Program evaluation if their primary purpose is to collect data to support a billing regression. The on-sites may be useful for other purposes, however, such as providing additional information on baseline conditions, customer attitudes toward efficiency and energy use, whether or not installed equipment is being used properly, and other factors that affect energy consumption.
- **Billing regression using a control group of non-participants.** The PY2009 evaluation also developed a billing regression that utilized a control group of low-income non-participants, where the PY2010 participants were used as a non-participant control group for PY2009. The theory underlying this method is that the control group customers will have similar patterns of energy use as participants and therefore will control for external events such as economic conditions within the model.[35] Selecting a well-matched control group is challenging at best, however, and particularly difficult in the low-income population given the variability across program years. Using the control group did not produce useful billing regression results in the previous evaluation, and we are not optimistic that these challenges can be overcome in future evaluations without significantly more resources being devoted to identifying an appropriate control group. Despite these concerns, future evaluations may want to explore the potential benefits of using a control group if there is a way to ensure that the control group matches the participant population on key demographic variables (e.g., home type, energy use, geographic location, vintage, etc.). Exploring the use of several alternative control groups in the billing regression may also prove useful, as this was not attempted in the previous impact evaluation.

[35] The control group also helps account for free ridership in the model, which is less of a concern with the low-income population where free ridership rates are likely very low.

7 Appendices

The report appendices (provided as a separate volume) include the following:

Appendix A: Phone Survey Instruments

Appendix B: Complete Phone Survey Result Tabulations (by IOU)

Appendix C: Detailed Regression Model Results

Appendix D: Detailed Impact Estimate Tables

EVERGREEN ECONOMICS

PY2011 Energy Savings Assistance Program Impact Evaluation

REPORT APPENDICES

August 30, 2013

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Appendix A: Phone Survey Instruments

The following instrument was used by CIC Research to conduct phone surveys among a random group of participants that were found to have increased their average annual energy use – accounting for temperature differences – after installing measures through the Energy Savings Assistance Program.

Intro. Hello, this is <INTERVIEWER NAME> calling from CIC Research on behalf of [UTILITY]. May I please speak with [PROGRAM CONTACT]?

I'm calling to do a follow-up survey about your participation in [UTILITY]'s [PROGRAM NAME].

The purpose of this survey is to help [UTILITY] better understand how your energy use may have changed since participating in [PROGRAM NAME]. This is the program where a representative from [UTILITY] came to your home and installed some energy savings items and gave you information on how to save energy. Our records indicate that you participated around [FIRST MONTH] of [FIRST YEAR], when they installed [MEASURE 1], [MEASURE 2], and [MEASURE 3]. [INTERVIEWER: DON'T GET HUNG UP ON THE DATE. ONLY USE DATE PERIODICALLY TO REMIND RESPONDENT, IF HELPFUL. IF RESPONDENT DISAGREES WITH DATE BUT IT'S CLOSE TO OUR DATE, DON'T REFER TO DATE BUT RATHER SAY: "SINCE YOU PARTICIPATED IN THE ESA PROGRAM."]

A1. Do you recall participating in the ESA program?

1	Yes	A2
2	No	Prompt: Is there anyone else at your home that might remember [PROGRAM NAME]?
77	Other [specify]	A2
88	Refused	T&T
99	Don't know	T&T

A2. Are you the best person to talk to about how your energy use may have changed since you participated in the ESA program?

1	Yes	C1
2	No	Prompt: May I speak to that person? [ARRANGE CB IF NECESSARY]

[Once appropriate contact found:]
For the rest of the survey I will refer to the [PROGRAM] as the "ESA Program" (and occasionally remind you of your participation date of approximately [FIRST MONTH] of [FIRST YEAR]).

Cooling Systems

First, I have a few questions about how you cool your home.

C1. Do you have an air conditioner or an evaporative cooler or a swamp cooler in your home?

1	Yes	Continue
2	No	C3
77	Other [specify]	C3
88	Refused	C3
99	Don't know	C3

C2. What type of air conditioning do you use? Is it . . . (IF MULTIPLES, RECORD WHICH IS PRIMARY AND WHICH IS SECONDARY. READ CHOICES)

1	Central air conditioning	Continue
2	Room air conditioning	Continue
3	Evaporative cooler / 'swamp' cooler	Continue
4	or something else (SPECIFY) _____	Continue
5	None are used (DO NOT READ)	Continue
88	Refused	Continue
99	Don't Know	Continue

C3. Do you ever use fans to cool your home?

1	Yes	Continue
2	No	C5
88	Refused	C5
99	Don't know	C5

C4. What type of fans do you use? Is it . . . (READ CHOICES)

1	Ceiling fans	Continue

2	Portable fans	Continue
3	Both ceiling and portable fans	Continue
88	Refused	Continue
99	Don't Know	Continue

Now I'd like to ask you a few questions about how you cool your home and how that may have changed since ([FIRST MONTH] of [FIRST YEAR], when) the ESA contractors visited your home and installed new energy efficient equipment.

C5. Did your participation in the ESA program (in [FIRST MONTH] of [FIRST YEAR]) cause you to change *the way* you cool your home? In other words, did you change which equipment you use to cool your home since that date?

1	Yes	Continue
2	No	C8
77	Other [specify]	C8
88	Refused	C8
99	Don't know	C8

C5a. Did you receive that new cooling equipment as part of the ESA program?

1	Yes	ASK C6, THEN SKIP TO C8
2	No	CONTINUE
88	Refused	CONTINUE
99	Don't Know	CONTINUE

C6. Before you participated in the ESA program, how did you usually cool your home? (If multiple responses, record primary and secondary cooling methods)

1	Central air conditioning	Continue
2	Room air conditioning	Continue
3	Evaporative cooler / 'swamp' cooler	Continue
4	Ceiling fans	Continue

5	Portable fans	Continue
6	No Cooling	Continue
77	Other [specify]	Continue
88	Refused	Continue
99	Don't Know	Continue

C7. Why did you change the way you cooled your home? _____
Record answer verbatim

C8. Since you participated in the ESA program, have you changed *how much* you cool your home?

1	Cooling home more	Continue
2	Cooling home less	H1
3	Cooling the same amount	H1
88	Refused	H1
99	Don't Know	H1

C9. How are you cooling your home more? (Do not read list, if multiple responses, record primary and secondary responses.)

1	Running central air conditioner more often	Continue
2	Running room AC's more often	Continue
3	Lowered the temperature on the thermostat	Continue
4	Running fans more often	Continue
5	Running evaporative cooler / 'swamp cooler' more often	Continue
6	Opened more windows / windows opened longer	Continue
7	Using shades on windows more often	Continue
9	Other (specify)	Continue
88	Refused	Continue
99	Don't Know	Continue

C10. Why are you cooling your home more now? [Do not read, multiple responses allowed]

1	Hotter weather now than before	H1
2	New system works better	H1
3	Old system was not functioning at all	H1
4	Now have disabled or elderly person at home during the day	H1
5	Lost job, now home during the day	H1
6	Working at home more now	H1
7	Family members want home cooler	H1
8	Am making more money now, can afford to keep house cooler	H1
9	Other (specify)	H1
88	Refused	H1
99	Don't Know	H1

Heating Systems

Now I'd like to ask you a few questions about the way you heat your home and how that may have changed since ([FIRST MONTH] of [FIRST YEAR], when) the ESA contractors visited your home.

H1. Which of the following best describes the primary way you heat your home? [READ]

1	Gas furnace	Continue
2	Electric forced air furnace	Continue
3	Electric Heat Pump	Continue
4	Electric Space Heater	Continue
5	No Heat	G1
77	Other [specify]	Continue
88	Refused	Continue
99	Don't Know	Continue

H2. Did your participation in the ESA program (on [FIRST MONTH] of [FIRST YEAR]) cause you to change *the way* you heat your home? In other words, did you change which equipment you use to heat your home since that date?

1	Yes	Continue
2	No	H5
88	Refused	H5
99	Don't know	Continue

H2a. Did you receive that new heating equipment as part of the ESA program?

1	Yes	ASK H3, THEN SKIP TO H5
2	No	CONTINUE
88	Refused	CONTINUE
99	Don't Know	CONTINUE

H3. Before you participated in the ESA program, how did you usually heat your home? (Do not read, if multiple responses, record primary and secondary heating methods)

1	Gas furnace	Continue
2	Electric forced air furnace	Continue
3	Electric Heat Pump	Continue
4	Electric Space Heater	Continue
5	No Heat	Continue
77	Other [specify]	Continue
88	Refused	Continue
99	Don't Know	Continue

H4. Why did you change the way you heat your home? _____
Record verbatim response

H5. Since you participated in the ESA program, have you changed *how much* you heat your home?

1	Heating home more	Continue

2	Heating home less	G1
3	Heating the same amount	G1
88	Refused	G1
99	Don't Know	G1

H6. How are you heating your home more? (Do not read, if multiple responses, record primary and secondary responses.)

1	Running furnace more often	G1
2	Running heat pump often	G1
3	Increased the temperature on the thermostat	G1
4	Using space heaters more often	G1
5	Other (specify)	G1
88	Refused	G1
99	Don't Know	G1

H7. Why are you heating your home more now? [Do not read list, multiple responses allowed]

1	Colder weather now than before	Continue
2	New system works better	Continue
3	Old system was not functioning at all	Continue
4	Now have disabled or elderly person at home during the day	Continue
5	Lost job, now home during the day	Continue
6	Working at home more now	Continue
7	Family members want home warmer	Continue
8	Am making more money now, can afford to keep house warmer	Continue
9	House is less drafty now, house stays warmer	Continue
10	Other (specify)	Continue

88	Refused	G1
99	Don't Know	G1

General

G1. Now I'm going to ask you if you received any new appliances or equipment that may have affected the energy use in your home since your involvement with the ESA program. Since that time ([FIRST MONTH] of [FIRST YEAR]), have you added or replaced any of the following items to your home? How about . . . [Record Yes/No for each appliance listed]

1	Stove	G6
2	Microwave*	G6
3	Water Heater*	G6
4	Clothes Washer*	G6
5	Dryer*	G6
6	Dishwasher	G6
7	TV - additional	G6
8	TV - replaced	G6
9	Computer(s) - additional	G6
10	Computer(s) – replaced existing	G6
11	Refrigerator(s)*	Continue
12	Freezer(s)*	Continue
77	Other [specify]	G6
88	Refused	G6
99	Don't Know	G6

G1a. (FOR EACH ITEM MARKED WITH AN * IN G1, ASK:) Did you get that [ITEM} as part of the ESA program?

1	Yes	CONTINUE

2	No	CONTINUE
88	Refused	CONTINUE
99	Don't Know	CONTINUE

G2. Did your old [Refrigerator/Freezer] get hauled away, or is it still running somewhere in your house, basement, or garage?

1	Hauled away	G6
2	Still running	Continue
3	Still have it in house/basement/garage but not running	G6
88	Refused	G6
99	Don't know	G6

G3. How old is the older [Refrigerator/Freezer]? Is it . . . (READ CHOICES)

1	1-5 years	Continue
2	5-10 years	Continue
3	10-15 years	Continue
4	15 or more years	Continue
88	Refused	G6
99	Don't know	G6

G4. Where is your old freezer or refrigerator plugged in? Is it in the basement, the garage, or somewhere else?

1	Basement	Continue
2	Garage	Continue
77	Other [Specify]	Continue
88	Refused	G6
99	Don't know	G6

G5. Is that room insulated?

1	Yes	Continue
2	No	Continue
88	Refused	Continue
99	Don't know	Continue

G6. Are there ANY appliances in your household that you didn't use before participating in the ESA program but are using now?

1	Yes	Continue
2	No	G8
88	Refused	G8
99	Don't know	G8

G7. Which of the following appliances have you started using since you participated in the program? [Read list, record all that apply]

1	Stove	Continue
2	Microwave	Continue
3	Water Heater	Continue
4	Washer	Continue
5	Dryer	Continue
6	Dishwasher	Continue
7	TV	Continue
8	Computer	Continue
9	Refrigerators	Continue
10	Freezers	Continue
77	Other [specify]	Continue
88	Refused	Continue

99	Don't Know	Continue

G8. Do you own or rent your home?

1	Own	O1
2	Rent	Continue
88	Refused	O1
99	Don't know	O1

G9. Does your landlord pay for any portion of the utilities?

1	Yes	Continue
2	No	Continue
88	Refused	Continue
99	Don't know	Continue

Household Occupancy

O1. Has the number of people living in your home changed since you participated in the ESA program?

1	Increased	Continue
2	Decreased	Continue
3	Stayed the same	O3
88	Refused	O3
99	Don't know	O3

O2. By how many did your household [O1]?

1	1-2	Continue
2	3-4	Continue
3	5 or more	Continue
88	Refused	Continue

99	Don't know	Continue

Q2a. How many people currently live in your house?
# of people: ___

O3. How many people over the age of 65 currently live in your house? #_____

88	Refused	Continue
99	Don't know	Continue

O4. How many people under the age of 2 currently live in your house?

88	Refused	Continue
99	Don't know	Continue

O5. Has the number of people that stay at home during the day changed since you participated in the ESA program?

1	Yes	Continue
2	No	HC1
88	Refused	HC1
99	Don't know	HC1

O6. How many more people stay at home during the day since you participated in the ESA program? #_____

88	Refused	Continue
99	Don't know	Continue

O7. What is the reason for more people staying at home? (MULTIPLES OK)

1	Lost job	Continue
2	Caring for children	Continue
3	Elderly parents moved in	Continue
4	Working at home more	Continue
5	Other	Continue
88	Refused	Continue

99	Don't know	Continue

Housing Characteristics

HC1. When was your house built? Was it . . . [READ RANGES]

1	In the last 10 years [i.e., since 2000]	Continue
2	In the 1990's	Continue
3	In the 1980's	Continue
4	In the 1970's	Continue
5	In the 1960's	Continue
6	In the 1950's	Continue
7	In the 1940's	Continue
8	Before 1940	Continue
88	Refused	Continue
99	Don't Know	Continue

HC2. Which of the following categories includes the size of your house? Is it . . . [READ RANGES]

1	Less than 500 square feet	Continue
2	Between 500 and 1000 square feet	Continue
3	Between 1000 and 1500 square feet	Continue
4	Between 1500 and 2000 square feet	Continue
5	Between 2000 and 2500 square feet	Continue
6	Between 2500 and 3000 square feet	Continue
7	More than 3,000 square feet	Continue
88	Refused	Continue
99	Don't Know	Continue

HC3. Have you done any remodeling or renovating since the program?

1	Yes	Continue
2	No	HC5
88	Refused	HC5
99	Don't know	HC5

HC4. Did Square Footage increase or decrease?

1	Yes, Increased	Continue
2	Yes, Decreased	Continue
3	No	Continue
88	Refused	Continue
99	Don't know	Continue

HC5. How has your combined gross household annual income changed since you participated in the ESA program? Would you say it has increased, decreased, or has there been no change?

1	Increase	Continue
2	Decrease	Continue
3	No Change	Continue
88	Refused	Continue
99	Don't know	Continue

HC6. Is there anything else that has occurred since you participated in the ESA program in [FIRST MONTH] of [FIRST YEAR] that we haven't talked about and that might have affected energy use in your home?
Thank you very much for your time and cooperation.

(INTERVIEWER: Record gender:)

1. Male
2. Female

Appendix B: Phone Survey Results Tabulations

Below are the complete results from ESA Participant Phone Survey. Cumulative, as well as utility-specific, totals are displayed for all questions.

A1. Do you recall participating in the Energy Savings Assistance Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes (continue to C1)	Count	150	150	151	151	602
	Row %	24.9%	24.9%	25.1%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%
No (Ask to speak to person who might be able to answer)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	150	150	151	151	602
	Row %	24.9%	24.9%	25.1%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

A2. Are you the best person to talk to about how your energy use may have changed since you participated in the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes (continue to C1)	Count	150	150	151	151	602
	Row %	24.9%	24.9%	25.1%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%
No (Ask to speak to person who might be able to answer). (arrange CB if necessary)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	150	150	151	151	602
	Row %	24.9%	24.9%	25.1%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C1. Do you have an air conditioner or an evaporative cooler or a swamp cooler in your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	79	110	106	76	371
	Row %	21.3%	29.6%	28.6%	20.5%	100.0%
	Col %	52.7%	73.3%	70.2%	50.3%	61.6%
No	Count	71	40	45	75	231
	Row %	30.7%	17.3%	19.5%	32.5%	100.0%
	Col %	47.3%	26.7%	29.8%	49.7%	38.4%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	150	150	151	151	602
	Row %	24.9%	24.9%	25.1%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C2. What type of air conditioning do you use? (PRIMARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Central air conditioning	Count	46	59	53	41	199
	Row %	23.1%	29.6%	26.6%	20.6%	100.0%
	Col %	58.2%	54.1%	50.5%	54.7%	54.1%
Room air conditioning	Count	18	18	20	31	87
	Row %	20.7%	20.7%	23.0%	35.6%	100.0%
	Col %	22.8%	16.5%	19.0%	41.3%	23.6%
Evaporative cooler / 'swamp cooler'	Count	14	31	32	2	79
	Row %	17.7%	39.2%	40.5%	2.5%	100.0%
	Col %	17.7%	28.4%	30.5%	2.7%	21.5%
None are used	Count	1	1	0	1	3
	Row %	33.3%	33.3%	0.0%	33.3%	100.0%
	Col %	1.3%	0.9%	0.0%	1.3%	0.8%
something else (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	79	109	105	75	368
	Row %	21.5%	29.6%	28.5%	20.4%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C2a. What OTHER types of air conditioning do you use? (SECONDARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Central air conditioning	Count	1	8	9	0	18
	Row %	5.6%	44.4%	50.0%	0.0%	100.0%
	Col %	1.3%	7.5%	8.7%	0.0%	5.0%
Room air conditioning	Count	6	12	6	3	27
	Row %	22.2%	44.4%	22.2%	11.1%	100.0%
	Col %	7.7%	11.2%	5.8%	4.1%	7.4%
Evaporative cooler / 'swamp cooler'	Count	2	6	5	2	15
	Row %	13.3%	40.0%	33.3%	13.3%	100.0%
	Col %	2.6%	5.6%	4.8%	2.7%	4.1%
Whole house fan	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	0.9%	0.0%	0.0%	0.3%
No other air conditioning	Count	69	81	84	69	303
	Row %	22.8%	26.7%	27.7%	22.8%	100.0%
	Col %	88.5%	75.7%	80.8%	93.2%	83.5%
Refused	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
something else (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	78	107	104	74	363
	Row %	21.5%	29.5%	28.7%	20.4%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C3. Do you ever use fans to cool your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	112	122	127	135	496
	Row %	22.6%	24.6%	25.6%	27.2%	100.0%
	Col %	74.7%	81.3%	84.1%	89.4%	82.4%
No	Count	38	28	24	16	106
	Row %	35.8%	26.4%	22.6%	15.1%	100.0%
	Col %	25.3%	18.7%	15.9%	10.6%	17.6%
Total	Count	150	150	151	151	602
	Row %	24.9%	24.9%	25.1%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C4. What type of fans do you use? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Ceiling fans	Count	30	31	46	19	126
	Row %	23.8%	24.6%	36.5%	15.1%	100.0%
	Col %	26.8%	25.4%	36.2%	14.1%	25.4%
Portable fans	Count	48	38	26	54	166
	Row %	28.9%	22.9%	15.7%	32.5%	100.0%
	Col %	42.9%	31.1%	20.5%	40.0%	33.5%
Both ceiling and portable fans	Count	34	53	55	62	204
	Row %	16.7%	26.0%	27.0%	30.4%	100.0%
	Col %	30.4%	43.4%	43.3%	45.9%	41.1%
Total	Count	112	122	127	135	496
	Row %	22.6%	24.6%	25.6%	27.2%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C5. Did your participation in the ESA program cause you to change the way you cool your home?

BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	9	20	21	14	64
	Row %	14.1%	31.2%	32.8%	21.9%	100.0%
	Col %	6.0%	13.3%	14.2%	9.3%	10.7%
No	Count	140	130	127	137	534
	Row %	26.2%	24.3%	23.8%	25.7%	100.0%
	Col %	94.0%	86.7%	85.8%	90.7%	89.3%
Other (specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	149	150	148	151	598
	Row %	24.9%	25.1%	24.7%	25.3%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C5a. Did you receive that new cooling equipment as part of the ESA program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	4	10	11	0	25
	Row %	16.0%	40.0%	44.0%	0.0%	100.0%
	Col %	44.4%	52.6%	55.0%	0.0%	40.3%
No	Count	5	9	9	14	37
	Row %	13.5%	24.3%	24.3%	37.8%	100.0%
	Col %	55.6%	47.4%	45.0%	100.0%	59.7%
Total	Count	9	19	20	14	62
	Row %	14.5%	30.6%	32.3%	22.6%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C6. Before you participated in the ESA program, how did you usually cool your home? (PRIMARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Central air conditioning	Count	2	9	11	3	25
	Row %	8.0%	36.0%	44.0%	12.0%	100.0%
	Col %	22.2%	45.0%	52.4%	21.4%	39.1%
Room air conditioning	Count	1	1	2	1	5
	Row %	20.0%	20.0%	40.0%	20.0%	100.0%
	Col %	11.1%	5.0%	9.5%	7.1%	7.8%
Evaporative cooler / 'swamp cooler'	Count	1	2	3	0	6
	Row %	16.7%	33.3%	50.0%	0.0%	100.0%
	Col %	11.1%	10.0%	14.3%	0.0%	9.4%

Ceiling fans	Count	1	1	2	1	5
	Row %	20.0%	20.0%	40.0%	20.0%	100.0%
	Col %	11.1%	5.0%	9.5%	7.1%	7.8%
Portable fans	Count	3	4	1	6	14
	Row %	21.4%	28.6%	7.1%	42.9%	100.0%
	Col %	33.3%	20.0%	4.8%	42.9%	21.9%
No Cooling	Count	1	1	1	1	4
	Row %	25.0%	25.0%	25.0%	25.0%	100.0%
	Col %	11.1%	5.0%	4.8%	7.1%	6.2%
opened windows	Count	0	2	0	2	4
	Row %	0.0%	50.0%	0.0%	50.0%	100.0%
	Col %	0.0%	10.0%	0.0%	14.3%	6.2%
hose off roof	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
keep windows/curtains closed	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	4.8%	0.0%	1.6%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	9	20	21	14	64
	Row %	14.1%	31.2%	32.8%	21.9%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C6a. Are there any other methods you used to cool your home before you participated in the ESA program? (SECONDARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Central air conditioning	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Room air conditioning	Count	0	1	1	0	2
	Row %	0.0%	50.0%	50.0%	0.0%	100.0%
	Col %	0.0%	5.0%	4.8%	0.0%	3.1%
Evaporative cooler / 'swamp cooler'	Count	0	0	0	1	1
	Row %	0.0%	0.0%	0.0%	100.0%	100.0%
	Col %	0.0%	0.0%	0.0%	7.1%	1.6%
Ceiling fans	Count	1	1	4	2	8
	Row %	12.5%	12.5%	50.0%	25.0%	100.0%
	Col %	11.1%	5.0%	19.0%	14.3%	12.5%
Portable fans	Count	2	5	6	3	16
	Row %	12.5%	31.2%	37.5%	18.8%	100.0%
	Col %	22.2%	25.0%	28.6%	21.4%	25.0%
No Cooling	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
opened windows	Count	0	2	0	0	2
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	10.0%	0.0%	0.0%	3.1%
hose off roof	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	11.1%	0.0%	0.0%	0.0%	1.6%

keep windows/curtains closed	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	5.0%	0.0%	0.0%	1.6%
No Other cooling methods	Count	6	11	12	9	38
	Row %	15.8%	28.9%	31.6%	23.7%	100.0%
	Col %	66.7%	55.0%	57.1%	64.3%	59.4%
Refused	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	9	20	21	14	64
	Row %	14.1%	31.2%	32.8%	21.9%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C7. Why did you change the way you cooled your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Save energy/new ones more efficient	Count	1	5	2	1	9
	Row %	11.1%	55.6%	22.2%	11.1%	100.0%
	Col %	20.0%	50.0%	20.0%	7.1%	23.1%
Save money	Count	1	5	3	7	16
	Row %	6.2%	31.2%	18.8%	43.8%	100.0%
	Col %	20.0%	50.0%	30.0%	50.0%	41.0%
Have child/elderly/ill people in home	Count	0	1	2	0	3
	Row %	0.0%	33.3%	66.7%	0.0%	100.0%
	Col %	0.0%	10.0%	20.0%	0.0%	7.7%
House is too hot/what I have wasn't doing it	Count	2	1	1	6	10
	Row %	20.0%	10.0%	10.0%	60.0%	100.0%
	Col %	40.0%	10.0%	10.0%	42.9%	25.6%
Didn't have one/ours was broken	Count	1	0	2	0	3
	Row %	33.3%	0.0%	66.7%	0.0%	100.0%
	Col %	20.0%	0.0%	20.0%	0.0%	7.7%
I got a swamp cooler	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	10.0%	0.0%	2.6%
Total	Count	5	10	10	14	39
	Row %	12.8%	25.6%	25.6%	35.9%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C8. Since you participated in the ESA program, would you say you are . . . ? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Cooling your home more	Count	4	19	16	9	48
	Row %	8.3%	39.6%	33.3%	18.8%	100.0%
	Col %	2.8%	12.8%	10.9%	6.1%	8.2%
Cooling your home less	Count	35	31	38	35	139
	Row %	25.2%	22.3%	27.3%	25.2%	100.0%
	Col %	24.3%	20.9%	25.9%	23.6%	23.7%
Cooling the same amount	Count	105	98	93	104	400
	Row %	26.2%	24.5%	23.2%	26.0%	100.0%
	Col %	72.9%	66.2%	63.3%	70.3%	68.1%
Total	Count	144	148	147	148	587
	Row %	24.5%	25.2%	25.0%	25.2%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C9. How are you cooling your home more? (PRIMARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Running central air conditioner more often	Count	0	4	2	2	8
	Row %	0.0%	50.0%	25.0%	25.0%	100.0%
	Col %	0.0%	21.1%	12.5%	22.2%	16.7%
Running room AC's more often	Count	2	4	2	2	10
	Row %	20.0%	40.0%	20.0%	20.0%	100.0%
	Col %	50.0%	21.1%	12.5%	22.2%	20.8%
Lowered the temperature on the thermostat	Count	1	0	2	0	3
	Row %	33.3%	0.0%	66.7%	0.0%	100.0%
	Col %	25.0%	0.0%	12.5%	0.0%	6.2%
Running fans more often	Count	0	3	2	3	8
	Row %	0.0%	37.5%	25.0%	37.5%	100.0%
	Col %	0.0%	15.8%	12.5%	33.3%	16.7%
Running evaporative cooler / 'swamp cooler' more often	Count	1	4	2	0	7
	Row %	14.3%	57.1%	28.6%	0.0%	100.0%
	Col %	25.0%	21.1%	12.5%	0.0%	14.6%
Opened more windows / windows opened longer	Count	0	3	1	1	5
	Row %	0.0%	60.0%	20.0%	20.0%	100.0%
	Col %	0.0%	15.8%	6.2%	11.1%	10.4%
Using shades on windows more often	Count	0	0	2	0	2
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	12.5%	0.0%	4.2%
more insulation/weather-stripping	Count	0	0	2	1	3
	Row %	0.0%	0.0%	66.7%	33.3%	100.0%
	Col %	0.0%	0.0%	12.5%	11.1%	6.2%

closed windows/doors	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
turn off lights	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
keeping doors closed in the morning	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	6.2%	0.0%	2.1%
turned off furnace / pilot	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	5.3%	0.0%	0.0%	2.1%
No other cooling methods	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	4	19	16	9	48
	Row %	8.3%	39.6%	33.3%	18.8%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C9a. Are there any other ways that you're cooling your home more? (SECONDARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Running central air conditioner more often	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Running room AC's more often	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Lowered the temperature on the thermostat	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	5.3%	0.0%	0.0%	2.1%
Running fans more often	Count	1	1	1	1	4
	Row %	25.0%	25.0%	25.0%	25.0%	100.0%
	Col %	25.0%	5.3%	6.2%	11.1%	8.3%
Running evaporative cooler / 'swamp cooler' more often	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Opened more windows / windows opened longer	Count	1	2	1	0	4
	Row %	25.0%	50.0%	25.0%	0.0%	100.0%
	Col %	25.0%	10.5%	6.2%	0.0%	8.3%
Using shades on windows more often	Count	0	4	2	0	6
	Row %	0.0%	66.7%	33.3%	0.0%	100.0%
	Col %	0.0%	21.1%	12.5%	0.0%	12.5%
more insulation/weather-stripping	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	6.2%	0.0%	2.1%

closed windows/doors	Count	0	0	2	0	2
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	12.5%	0.0%	4.2%
turn off lights	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	5.3%	0.0%	0.0%	2.1%
keeping doors closed in the morning	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
turned off furnace / pilot	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
No other cooling methods	Count	2	10	9	8	29
	Row %	6.9%	34.5%	31.0%	27.6%	100.0%
	Col %	50.0%	52.6%	56.2%	88.9%	60.4%
Refused	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	4	19	16	9	48
	Row %	8.3%	39.6%	33.3%	18.8%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

C10. Why are you cooling your home more now? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Hotter weather now than before	Count	4	10	4	6	24
	Row %	16.7%	41.7%	16.7%	25.0%	100.0%
	Col %	100.0%	52.6%	25.0%	66.7%	50.0%
New system works better	Count	0	1	1	0	2
	Row %	0.0%	50.0%	50.0%	0.0%	100.0%
	Col %	0.0%	5.3%	6.2%	0.0%	4.2%
Old system was not functioning at all	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Now have disabled or elderly person at home during the day	Count	0	1	1	0	2
	Row %	0.0%	50.0%	50.0%	0.0%	100.0%
	Col %	0.0%	5.3%	6.2%	0.0%	4.2%
Lost job, now home during the day	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Working at home more now	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Family members want home cooler	Count	0	3	1	0	4
	Row %	0.0%	75.0%	25.0%	0.0%	100.0%
	Col %	0.0%	15.8%	6.2%	0.0%	8.3%
Am making more money now, can afford to keep house cooler	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%

Have new baby/children/pets	Count	0	3	3	0	6
	Row %	0.0%	50.0%	50.0%	0.0%	100.0%
	Col %	0.0%	15.8%	18.8%	0.0%	12.5%
new system is more cost efficient	Count	0	2	1	1	4
	Row %	0.0%	50.0%	25.0%	25.0%	100.0%
	Col %	0.0%	10.5%	6.2%	11.1%	8.3%
new insulation/weatherstripping make the house cooler	Count	0	0	3	0	3
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	18.8%	0.0%	6.2%
new swamp cooler does not cool as well as the previous one	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	5.3%	0.0%	0.0%	2.1%
home more now	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	6.2%	0.0%	2.1%
new swamp cooler does not cool as well as the previous one	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Refused	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	0	1	1	2	4
	Row %	0.0%	25.0%	25.0%	50.0%	100.0%
	Col %	0.0%	5.3%	6.2%	22.2%	8.3%
Total	Count	4	19	16	9	48
	Row %	8.3%	39.6%	33.3%	18.8%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H1. Which of the following best describes the primary way you heat your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Gas furnace	Count	76	91	101	75	343
	Row %	22.2%	26.5%	29.4%	21.9%	100.0%
	Col %	51.4%	61.5%	69.7%	50.3%	58.1%
Electric forced air furnace	Count	22	18	17	23	80
	Row %	27.5%	22.5%	21.2%	28.8%	100.0%
	Col %	14.9%	12.2%	11.7%	15.4%	13.6%
Electric Heat Pump	Count	2	1	3	5	11
	Row %	18.2%	9.1%	27.3%	45.5%	100.0%
	Col %	1.4%	0.7%	2.1%	3.4%	1.9%
Electric Space Heater	Count	18	18	8	16	60
	Row %	30.0%	30.0%	13.3%	26.7%	100.0%
	Col %	12.2%	12.2%	5.5%	10.7%	10.2%
No Heat	Count	7	13	9	23	52
	Row %	13.5%	25.0%	17.3%	44.2%	100.0%
	Col %	4.7%	8.8%	6.2%	15.4%	8.8%
Wood stove	Count	6	0	2	0	8
	Row %	75.0%	0.0%	25.0%	0.0%	100.0%
	Col %	4.1%	0.0%	1.4%	0.0%	1.4%
Fireplace	Count	8	3	2	2	15
	Row %	53.3%	20.0%	13.3%	13.3%	100.0%
	Col %	5.4%	2.0%	1.4%	1.3%	2.5%
Cook stove/oven	Count	0	2	0	0	2
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	1.4%	0.0%	0.0%	0.3%
Electric baseboard heater	Count	2	0	0	0	2
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	1.4%	0.0%	0.0%	0.0%	0.3%

electric wall heater	Count	1	0	1	1	3
	Row %	33.3%	0.0%	33.3%	33.3%	100.0%
	Col %	0.7%	0.0%	0.7%	0.7%	0.5%
electric ceiling radiant	Count	0	1	0	2	3
	Row %	0.0%	33.3%	0.0%	66.7%	100.0%
	Col %	0.0%	0.7%	0.0%	1.3%	0.5%
propane	Count	3	0	0	0	3
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	2.0%	0.0%	0.0%	0.0%	0.5%
gas wall heater	Count	0	1	1	0	2
	Row %	0.0%	50.0%	50.0%	0.0%	100.0%
	Col %	0.0%	0.7%	0.7%	0.0%	0.3%
gas space heater	Count	0	0	1	1	2
	Row %	0.0%	0.0%	50.0%	50.0%	100.0%
	Col %	0.0%	0.0%	0.7%	0.7%	0.3%
chimney	Count	1	0	0	1	2
	Row %	50.0%	0.0%	0.0%	50.0%	100.0%
	Col %	0.7%	0.0%	0.0%	0.7%	0.3%
central heating unspecified	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	0.7%	0.0%	0.0%	0.0%	0.2%
kerosene/heating oil	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	0.7%	0.0%	0.0%	0.0%	0.2%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	148	148	145	149	590
	Row %	25.1%	25.1%	24.6%	25.3%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H2. Did your participation in the ESA program cause you to change the way you heat your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	18	18	16	13	65
	Row %	27.7%	27.7%	24.6%	20.0%	100.0%
	Col %	12.7%	13.3%	11.3%	10.2%	11.9%
No	Count	124	117	126	115	482
	Row %	25.7%	24.3%	26.1%	23.9%	100.0%
	Col %	87.3%	86.7%	88.7%	89.8%	88.1%
Total	Count	142	135	142	128	547
	Row %	26.0%	24.7%	26.0%	23.4%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H2a. Did you receive that new heating equipment as part of the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	1	8	6	7	22
	Row %	4.5%	36.4%	27.3%	31.8%	100.0%
	Col %	6.7%	44.4%	40.0%	58.3%	36.7%
No	Count	14	10	9	5	38
	Row %	36.8%	26.3%	23.7%	13.2%	100.0%
	Col %	93.3%	55.6%	60.0%	41.7%	63.3%
Total	Count	15	18	15	12	60
	Row %	25.0%	30.0%	25.0%	20.0%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H3. Before you participated in the ESA program, how did you usually heat your home? (PRIMARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Gas furnace	Count	9	11	10	5	35
	Row %	25.7%	31.4%	28.6%	14.3%	100.0%
	Col %	47.4%	61.1%	62.5%	41.7%	53.8%
Electric forced air furnace	Count	1	0	2	1	4
	Row %	25.0%	0.0%	50.0%	25.0%	100.0%
	Col %	5.3%	0.0%	12.5%	8.3%	6.2%
Electric Heat Pump	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	5.6%	0.0%	0.0%	1.5%
Electric Space Heater	Count	2	3	2	5	12
	Row %	16.7%	25.0%	16.7%	41.7%	100.0%
	Col %	10.5%	16.7%	12.5%	41.7%	18.5%
No Heat	Count	0	0	2	1	3
	Row %	0.0%	0.0%	66.7%	33.3%	100.0%
	Col %	0.0%	0.0%	12.5%	8.3%	4.6%
Propane	Count	3	0	0	0	3
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	15.8%	0.0%	0.0%	0.0%	4.6%
Fireplace	Count	1	3	0	0	4
	Row %	25.0%	75.0%	0.0%	0.0%	100.0%
	Col %	5.3%	16.7%	0.0%	0.0%	6.2%
Kerosene	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	5.3%	0.0%	0.0%	0.0%	1.5%
Oven/stove top	Count	2	0	0	0	2
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	10.5%	0.0%	0.0%	0.0%	3.1%

Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	19	18	16	12	65
	Row %	29.2%	27.7%	24.6%	18.5%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H3A. Are there any other methods you used to heat your home before you participated in the ESA program? (SECONDARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Gas furnace	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Electric forced air furnace	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Electric Heat Pump	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Electric Space Heater	Count	2	4	2	2	10
	Row %	20.0%	40.0%	20.0%	20.0%	100.0%
	Col %	10.5%	20.0%	14.3%	16.7%	15.4%
Propane	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Fireplace	Count	1	0	1	0	2
	Row %	50.0%	0.0%	50.0%	0.0%	100.0%
	Col %	5.3%	0.0%	7.1%	0.0%	3.1%
Kerosene	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Oven/stove top	Count	1	0	0	2	3
	Row %	33.3%	0.0%	0.0%	66.7%	100.0%
	Col %	5.3%	0.0%	0.0%	16.7%	4.6%

open the window to make the heat come in & close the curtains to trap the heat in the house	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	5.3%	0.0%	0.0%	0.0%	1.5%
Gas space heater	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	5.3%	0.0%	0.0%	0.0%	1.5%
No other heating methods	Count	12	16	11	8	47
	Row %	25.5%	34.0%	23.4%	17.0%	100.0%
	Col %	63.2%	80.0%	78.6%	66.7%	72.3%
Refused	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	5.3%	0.0%	0.0%	0.0%	1.5%
Total	Count	19	20	14	12	65
	Row %	29.2%	30.8%	21.5%	18.5%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H4. Why did you change the way you heat your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Save energy/new ones more efficient	Count	2	3	0	0	5
	Row %	40.0%	60.0%	0.0%	0.0%	100.0%
	Col %	11.1%	27.3%	0.0%	0.0%	11.1%
Save money	Count	6	3	2	2	13
	Row %	46.2%	23.1%	15.4%	15.4%	100.0%
	Col %	33.3%	27.3%	20.0%	33.3%	28.9%
Previous heater was old & inefficient/broke down	Count	5	0	4	0	9
	Row %	55.6%	0.0%	44.4%	0.0%	100.0%
	Col %	27.8%	0.0%	40.0%	0.0%	20.0%
After ESA service, could heat better with less	Count	3	0	0	1	4
	Row %	75.0%	0.0%	0.0%	25.0%	100.0%
	Col %	16.7%	0.0%	0.0%	16.7%	8.9%
Heater got fixed so could use it	Count	0	2	0	1	3
	Row %	0.0%	66.7%	0.0%	33.3%	100.0%
	Col %	0.0%	18.2%	0.0%	16.7%	6.7%
To make home more comfortable	Count	2	3	1	0	6
	Row %	33.3%	50.0%	16.7%	0.0%	100.0%
	Col %	11.1%	27.3%	10.0%	0.0%	13.3%
They turned off/red-tagged my furnace	Count	0	1	1	1	3
	Row %	0.0%	33.3%	33.3%	33.3%	100.0%
	Col %	0.0%	9.1%	10.0%	16.7%	6.7%
Just heat rooms we're using, not whole house	Count	0	0	1	1	2
	Row %	0.0%	0.0%	50.0%	50.0%	100.0%
	Col %	0.0%	0.0%	10.0%	16.7%	4.4%

DK	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	10.0%	0.0%	2.2%
Total	Count	18	11	10	6	45
	Row %	40.0%	24.4%	22.2%	13.3%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H5. Since you participated in the ESA program, would you say you are . . . ? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Heating your home more	Count	16	10	15	9	50
	Row %	32.0%	20.0%	30.0%	18.0%	100.0%
	Col %	11.4%	7.5%	10.9%	7.3%	9.3%
Heating your home less	Count	47	44	42	40	173
	Row %	27.2%	25.4%	24.3%	23.1%	100.0%
	Col %	33.6%	32.8%	30.4%	32.3%	32.3%
Heating the same amount	Count	77	80	81	75	313
	Row %	24.6%	25.6%	25.9%	24.0%	100.0%
	Col %	55.0%	59.7%	58.7%	60.5%	58.4%
Total	Count	140	134	138	124	536
	Row %	26.1%	25.0%	25.7%	23.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H6. How are you heating your home more? (PRIMARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Running furnace more often	Count	7	5	4	5	21
	Row %	33.3%	23.8%	19.0%	23.8%	100.0%
	Col %	43.8%	55.6%	28.6%	55.6%	43.8%
Running heat pump often	Count	0	0	0	1	1
	Row %	0.0%	0.0%	0.0%	100.0%	100.0%
	Col %	0.0%	0.0%	0.0%	11.1%	2.1%
Increased the temperature on the thermostat	Count	4	0	1	2	7
	Row %	57.1%	0.0%	14.3%	28.6%	100.0%
	Col %	25.0%	0.0%	7.1%	22.2%	14.6%
Using space heaters more often	Count	5	3	6	1	15
	Row %	33.3%	20.0%	40.0%	6.7%	100.0%
	Col %	31.2%	33.3%	42.9%	11.1%	31.2%
close up house more	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	7.1%	0.0%	2.1%
wasn't heating before/heater didn't work	Count	0	1	2	0	3
	Row %	0.0%	33.3%	66.7%	0.0%	100.0%
	Col %	0.0%	11.1%	14.3%	0.0%	6.2%
Use oven to heat more	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	16	9	14	9	48
	Row %	33.3%	18.8%	29.2%	18.8%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H6A. Are there any other ways that you're heating your home more? (SECONDARY) BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Running furnace more often	Count	2	1	0	0	3
	Row %	66.7%	33.3%	0.0%	0.0%	100.0%
	Col %	12.5%	11.1%	0.0%	0.0%	6.2%
Running heat pump often	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Increased the temperature on the thermostat	Count	1	1	0	0	2
	Row %	50.0%	50.0%	0.0%	0.0%	100.0%
	Col %	6.2%	11.1%	0.0%	0.0%	4.2%
Using space heaters more often	Count	2	1	1	1	5
	Row %	40.0%	20.0%	20.0%	20.0%	100.0%
	Col %	12.5%	11.1%	7.1%	11.1%	10.4%
close up house more	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
wasn't heating before/heater didn't work	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Use oven to heat more	Count	1	1	1	0	3
	Row %	33.3%	33.3%	33.3%	0.0%	100.0%
	Col %	6.2%	11.1%	7.1%	0.0%	6.2%
No other heating methods	Count	10	5	12	8	35
	Row %	28.6%	14.3%	34.3%	22.9%	100.0%
	Col %	62.5%	55.6%	85.7%	88.9%	72.9%
Refused	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%

Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	16	9	14	9	48
	Row %	33.3%	18.8%	29.2%	18.8%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

H7. Why are you heating your home more now? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Colder weather now than before	Count	6	3	8	5	22
	Row %	27.3%	13.6%	36.4%	22.7%	100.0%
	Col %	37.5%	30.0%	53.3%	55.6%	44.0%
New system works better	Count	0	1	0	1	2
	Row %	0.0%	50.0%	0.0%	50.0%	100.0%
	Col %	0.0%	10.0%	0.0%	11.1%	4.0%
Old system was not functioning at all/didn't have one	Count	0	3	2	2	7
	Row %	0.0%	42.9%	28.6%	28.6%	100.0%
	Col %	0.0%	30.0%	13.3%	22.2%	14.0%
Now have disabled or elderly person at home during the day	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	6.7%	0.0%	2.0%
Lost job, now home during the day	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Working at home more now	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Family members want home warmer	Count	3	1	1	0	5
	Row %	60.0%	20.0%	20.0%	0.0%	100.0%
	Col %	18.8%	10.0%	6.7%	0.0%	10.0%
Am making more money now, can afford to keep house warmer	Count	1	1	0	0	2
	Row %	50.0%	50.0%	0.0%	0.0%	100.0%
	Col %	6.2%	10.0%	0.0%	0.0%	4.0%

House is less drafty now, house stays warmer	Count	2	1	1	0	4
	Row %	50.0%	25.0%	25.0%	0.0%	100.0%
	Col %	12.5%	10.0%	6.7%	0.0%	8.0%
have new baby/children/pets	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	6.7%	0.0%	2.0%
getting old and ill	Count	3	0	1	1	5
	Row %	60.0%	0.0%	20.0%	20.0%	100.0%
	Col %	18.8%	0.0%	6.7%	11.1%	10.0%
realize it doesn't cost as much to heat as I thought	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	10.0%	0.0%	0.0%	2.0%
it's an old house	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	6.2%	0.0%	0.0%	0.0%	2.0%
an extra person living in home	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	6.2%	0.0%	0.0%	0.0%	2.0%
Refused	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	16	10	15	9	50
	Row %	32.0%	20.0%	30.0%	18.0%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G1. Since your involvement with the ESA program, have you added or replaced any of the following items to your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Stove	Count	14	14	13	12	53
	Row %	26.4%	26.4%	24.5%	22.6%	100.0%
	Col %	13.2%	13.3%	11.7%	10.6%	12.2%
Microwave	Count	15	21	19	25	80
	Row %	18.8%	26.2%	23.8%	31.2%	100.0%
	Col %	14.2%	20.0%	17.1%	22.1%	18.4%
Water Heater	Count	17	19	22	12	70
	Row %	24.3%	27.1%	31.4%	17.1%	100.0%
	Col %	16.0%	18.1%	19.8%	10.6%	16.1%
Clothes Washer	Count	12	23	24	28	87
	Row %	13.8%	26.4%	27.6%	32.2%	100.0%
	Col %	11.3%	21.9%	21.6%	24.8%	20.0%
Dryer	Count	10	15	15	12	52
	Row %	19.2%	28.8%	28.8%	23.1%	100.0%
	Col %	9.4%	14.3%	13.5%	10.6%	12.0%
Dishwasher	Count	11	4	4	11	30
	Row %	36.7%	13.3%	13.3%	36.7%	100.0%
	Col %	10.4%	3.8%	3.6%	9.7%	6.9%
TV(s) - additional	Count	13	19	19	23	74
	Row %	17.6%	25.7%	25.7%	31.1%	100.0%
	Col %	12.3%	18.1%	17.1%	20.4%	17.0%
TV(s) - replaced existing	Count	41	33	41	48	163
	Row %	25.2%	20.2%	25.2%	29.4%	100.0%
	Col %	38.7%	31.4%	36.9%	42.5%	37.5%

Computer(s) - additional	Count	26	12	15	22	75
	Row %	34.7%	16.0%	20.0%	29.3%	100.0%
	Col %	24.5%	11.4%	13.5%	19.5%	17.2%
Computer(s) - replaced existing	Count	14	15	21	27	77
	Row %	18.2%	19.5%	27.3%	35.1%	100.0%
	Col %	13.2%	14.3%	18.9%	23.9%	17.7%
Refrigerator(s)	Count	22	30	28	30	110
	Row %	20.0%	27.3%	25.5%	27.3%	100.0%
	Col %	20.8%	28.6%	25.2%	26.5%	25.3%
Freezer(s)	Count	3	10	3	2	18
	Row %	16.7%	55.6%	16.7%	11.1%	100.0%
	Col %	2.8%	9.5%	2.7%	1.8%	4.1%
gas/central furnace	Count	1	1	1	1	4
	Row %	25.0%	25.0%	25.0%	25.0%	100.0%
	Col %	0.9%	1.0%	0.9%	0.9%	0.9%
AC	Count	0	2	1	0	3
	Row %	0.0%	66.7%	33.3%	0.0%	100.0%
	Col %	0.0%	1.9%	0.9%	0.0%	0.7%
swamp cooler/evap cooler	Count	1	0	2	0	3
	Row %	33.3%	0.0%	66.7%	0.0%	100.0%
	Col %	0.9%	0.0%	1.8%	0.0%	0.7%
portable heater	Count	1	1	1	2	5
	Row %	20.0%	20.0%	20.0%	40.0%	100.0%
	Col %	0.9%	1.0%	0.9%	1.8%	1.1%
air purifier/humidifier	Count	1	2	0	0	3
	Row %	33.3%	66.7%	0.0%	0.0%	100.0%
	Col %	0.9%	1.9%	0.0%	0.0%	0.7%
solar system	Count	0	0	0	1	1
	Row %	0.0%	0.0%	0.0%	100.0%	100.0%
	Col %	0.0%	0.0%	0.0%	0.9%	0.2%

ceiling fan	Count	0	0	0	2	2
	Row %	0.0%	0.0%	0.0%	100.0%	100.0%
	Col %	0.0%	0.0%	0.0%	1.8%	0.5%
window AC	Count	0	0	0	4	4
	Row %	0.0%	0.0%	0.0%	100.0%	100.0%
	Col %	0.0%	0.0%	0.0%	3.5%	0.9%
pool pump/Jacuzzi	Count	0	1	1	1	3
	Row %	0.0%	33.3%	33.3%	33.3%	100.0%
	Col %	0.0%	1.0%	0.9%	0.9%	0.7%
double paned windows	Count	0	0	0	1	1
	Row %	0.0%	0.0%	0.0%	100.0%	100.0%
	Col %	0.0%	0.0%	0.0%	0.9%	0.2%
misc. small appliances	Count	5	0	1	2	8
	Row %	62.5%	0.0%	12.5%	25.0%	100.0%
	Col %	4.7%	0.0%	0.9%	1.8%	1.8%
portable oven	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
forced air and heating unit. The air duct	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	1.0%	0.0%	0.0%	0.2%
Other (specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	2	0	0	0	2
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	1.9%	0.0%	0.0%	0.0%	0.5%
Total	Count	106	105	111	113	435
	Row %	24.4%	24.1%	25.5%	26.0%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G1_2. Did you get that Microwave as part of the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	1	0	1	6	8
	Row %	12.5%	0.0%	12.5%	75.0%	100.0%
	Col %	6.7%	0.0%	5.3%	25.0%	10.3%
No	Count	14	20	18	18	70
	Row %	20.0%	28.6%	25.7%	25.7%	100.0%
	Col %	93.3%	100.0%	94.7%	75.0%	89.7%
Total	Count	15	20	19	24	78
	Row %	19.2%	25.6%	24.4%	30.8%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G1_2. Did you get that Water Heater as part of the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	2	3	6	0	11
	Row %	18.2%	27.3%	54.5%	0.0%	100.0%
	Col %	12.5%	15.8%	30.0%	0.0%	16.9%
No	Count	14	16	14	10	54
	Row %	25.9%	29.6%	25.9%	18.5%	100.0%
	Col %	87.5%	84.2%	70.0%	100.0%	83.1%
Total	Count	16	19	20	10	65
	Row %	24.6%	29.2%	30.8%	15.4%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G1_2. Did you get that Clothes Washer as part of the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	0	11	4	11	26
	Row %	0.0%	42.3%	15.4%	42.3%	100.0%
	Col %	0.0%	47.8%	17.4%	39.3%	30.2%
No	Count	12	12	19	17	60
	Row %	20.0%	20.0%	31.7%	28.3%	100.0%
	Col %	100.0%	52.2%	82.6%	60.7%	69.8%
Total	Count	12	23	23	28	86
	Row %	14.0%	26.7%	26.7%	32.6%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G1_2. Did you get that Dryer as part of the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	7.1%	0.0%	2.0%
No	Count	10	15	13	12	50
	Row %	20.0%	30.0%	26.0%	24.0%	100.0%
	Col %	100.0%	100.0%	92.9%	100.0%	98.0%
Total	Count	10	15	14	12	51
	Row %	19.6%	29.4%	27.5%	23.5%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G1_2. Did you get that Refrigerator as part of the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	7	5	11	13	36
	Row %	19.4%	13.9%	30.6%	36.1%	100.0%
	Col %	31.8%	17.2%	39.3%	43.3%	33.0%
No	Count	15	24	17	17	73
	Row %	20.5%	32.9%	23.3%	23.3%	100.0%
	Col %	68.2%	82.8%	60.7%	56.7%	67.0%
Total	Count	22	29	28	30	109
	Row %	20.2%	26.6%	25.7%	27.5%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G1_2. Did you get that Freezer as part of the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	1	1	0	0	2
	Row %	50.0%	50.0%	0.0%	0.0%	100.0%
	Col %	33.3%	10.0%	0.0%	0.0%	11.1%
No	Count	2	9	3	2	16
	Row %	12.5%	56.2%	18.8%	12.5%	100.0%
	Col %	66.7%	90.0%	100.0%	100.0%	88.9%
Total	Count	3	10	3	2	18
	Row %	16.7%	55.6%	16.7%	11.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G2. Did your old Refrigerator / Freezer get hauled away, or is it still running somewhere in your house, basement, or garage? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Hauled away	Count	17	20	27	28	92
	Row %	18.5%	21.7%	29.3%	30.4%	100.0%
	Col %	70.8%	55.6%	90.0%	90.3%	76.0%
Still running	Count	3	2	1	1	7
	Row %	42.9%	28.6%	14.3%	14.3%	100.0%
	Col %	12.5%	5.6%	3.3%	3.2%	5.8%
Still have it in house/basement/garage but not running	Count	3	6	1	1	11
	Row %	27.3%	54.5%	9.1%	9.1%	100.0%
	Col %	12.5%	16.7%	3.3%	3.2%	9.1%
Refrigerator / Freezer is NEW, not a replacement	Count	1	8	1	1	11
	Row %	9.1%	72.7%	9.1%	9.1%	100.0%
	Col %	4.2%	22.2%	3.3%	3.2%	9.1%
Total	Count	24	36	30	31	121
	Row %	19.8%	29.8%	24.8%	25.6%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G3. How old is the older Refrigerator / Freezer BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
1-5 years	Count	0	1	0	1	2
	Row %	0.0%	50.0%	0.0%	50.0%	100.0%
	Col %	0.0%	50.0%	0.0%	100.0%	28.6%
5-10 years	Count	2	1	0	0	3
	Row %	66.7%	33.3%	0.0%	0.0%	100.0%
	Col %	66.7%	50.0%	0.0%	0.0%	42.9%
10-15 years	Count	1	0	1	0	2
	Row %	50.0%	0.0%	50.0%	0.0%	100.0%
	Col %	33.3%	0.0%	100.0%	0.0%	28.6%
15 or more years	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	3	2	1	1	7
	Row %	42.9%	28.6%	14.3%	14.3%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G4. Where is your old freezer or refrigerator plugged in? Is it in the basement, the garage, or somewhere else?

BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Basement	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Garage	Count	1	1	1	0	3
	Row %	33.3%	33.3%	33.3%	0.0%	100.0%
	Col %	33.3%	50.0%	100.0%	0.0%	42.9%
kitchen	Count	1	1	0	1	3
	Row %	33.3%	33.3%	0.0%	33.3%	100.0%
	Col %	33.3%	50.0%	0.0%	100.0%	42.9%
kitchen of our rental house	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	33.3%	0.0%	0.0%	0.0%	14.3%
Other (specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	3	2	1	1	7
	Row %	42.9%	28.6%	14.3%	14.3%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G5. Is that room insulated? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	1	1	0	0	2
	Row %	50.0%	50.0%	0.0%	0.0%	100.0%
	Col %	33.3%	50.0%	0.0%	0.0%	28.6%
No	Count	2	1	1	1	5
	Row %	40.0%	20.0%	20.0%	20.0%	100.0%
	Col %	66.7%	50.0%	100.0%	100.0%	71.4%
Total	Count	3	2	1	1	7
	Row %	42.9%	28.6%	14.3%	14.3%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G6. Are there ANY appliances in your household that you didn't use before participating in the ESA program but are using now? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	11	8	5	4	28
	Row %	39.3%	28.6%	17.9%	14.3%	100.0%
	Col %	7.3%	5.4%	3.3%	2.6%	4.7%
No	Count	139	141	145	147	572
	Row %	24.3%	24.7%	25.3%	25.7%	100.0%
	Col %	92.7%	94.6%	96.7%	97.4%	95.3%
Total	Count	150	149	150	151	600
	Row %	25.0%	24.8%	25.0%	25.2%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G7. Which of the following appliances have you started using since you participated in the program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Stove	Count	0	1	1	0	2
	Row %	0.0%	50.0%	50.0%	0.0%	100.0%
	Col %	0.0%	12.5%	20.0%	0.0%	7.1%
Microwave	Count	0	2	0	0	2
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	25.0%	0.0%	0.0%	7.1%
Water Heater	Count	0	3	1	0	4
	Row %	0.0%	75.0%	25.0%	0.0%	100.0%
	Col %	0.0%	37.5%	20.0%	0.0%	14.3%
Washer	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	20.0%	0.0%	3.6%
Dryer	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	12.5%	0.0%	0.0%	3.6%
Dishwasher	Count	2	0	0	0	2
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	18.2%	0.0%	0.0%	0.0%	7.1%
TV	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	9.1%	0.0%	0.0%	0.0%	3.6%
Computer	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%

Refrigerators	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	9.1%	0.0%	0.0%	0.0%	3.6%
Freezers	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	9.1%	0.0%	0.0%	0.0%	3.6%
gas/central furnace	Count	1	0	1	2	4
	Row %	25.0%	0.0%	25.0%	50.0%	100.0%
	Col %	9.1%	0.0%	20.0%	50.0%	14.3%
AC	Count	0	0	1	1	2
	Row %	0.0%	0.0%	50.0%	50.0%	100.0%
	Col %	0.0%	0.0%	20.0%	25.0%	7.1%
swamp cooler/evap cooler	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
portable heater	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	20.0%	0.0%	3.6%
air purifier/humidifier	Count	1	1	0	1	3
	Row %	33.3%	33.3%	0.0%	33.3%	100.0%
	Col %	9.1%	12.5%	0.0%	25.0%	10.7%
solar system	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
ceiling fan	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	9.1%	0.0%	0.0%	0.0%	3.6%
window AC	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%

pool pump/Jacuzzi	Count	1	1	0	0	2
	Row %	50.0%	50.0%	0.0%	0.0%	100.0%
	Col %	9.1%	12.5%	0.0%	0.0%	7.1%
double paned windows	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
misc. small appliances	Count	4	1	0	0	5
	Row %	80.0%	20.0%	0.0%	0.0%	100.0%
	Col %	36.4%	12.5%	0.0%	0.0%	17.9%
portable oven	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	12.5%	0.0%	0.0%	3.6%
Refused	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Other (specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	11	8	5	4	28
	Row %	39.3%	28.6%	17.9%	14.3%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G8. Do you own or rent your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Own	Count	108	107	119	87	421
	Row %	25.7%	25.4%	28.3%	20.7%	100.0%
	Col %	73.0%	71.8%	78.8%	57.6%	70.3%
Rent	Count	40	42	32	64	178
	Row %	22.5%	23.6%	18.0%	36.0%	100.0%
	Col %	27.0%	28.2%	21.2%	42.4%	29.7%
Total	Count	148	149	151	151	599
	Row %	24.7%	24.9%	25.2%	25.2%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

G9. Does your landlord pay for any portion of the electric & gas utilities? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	2	3	2	3	10
	Row %	20.0%	30.0%	20.0%	30.0%	100.0%
	Col %	5.0%	7.1%	6.2%	4.8%	5.6%
No	Count	38	39	30	60	167
	Row %	22.8%	23.4%	18.0%	35.9%	100.0%
	Col %	95.0%	92.9%	93.8%	95.2%	94.4%
Total	Count	40	42	32	63	177
	Row %	22.6%	23.7%	18.1%	35.6%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

O1. Has the number of people living in your home changed since you participated in the ESA program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Increased	Count	14	20	16	17	67
	Row %	20.9%	29.9%	23.9%	25.4%	100.0%
	Col %	9.5%	13.4%	10.6%	11.3%	11.2%
Decreased	Count	4	9	6	7	26
	Row %	15.4%	34.6%	23.1%	26.9%	100.0%
	Col %	2.7%	6.0%	4.0%	4.7%	4.3%
Stayed the same	Count	130	120	129	126	505
	Row %	25.7%	23.8%	25.5%	25.0%	100.0%
	Col %	87.8%	80.5%	85.4%	84.0%	84.4%
Total	Count	148	149	151	150	598
	Row %	24.7%	24.9%	25.3%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

O2. By how many did your household increase/decrease? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
1	Count	11	22	13	15	61
	Row %	18.0%	36.1%	21.3%	24.6%	100.0%
	Col %	61.1%	78.6%	59.1%	62.5%	66.3%
2	Count	5	3	6	6	20
	Row %	25.0%	15.0%	30.0%	30.0%	100.0%
	Col %	27.8%	10.7%	27.3%	25.0%	21.7%
3	Count	1	1	1	1	4
	Row %	25.0%	25.0%	25.0%	25.0%	100.0%
	Col %	5.6%	3.6%	4.5%	4.2%	4.3%
4	Count	1	2	0	0	3
	Row %	33.3%	66.7%	0.0%	0.0%	100.0%
	Col %	5.6%	7.1%	0.0%	0.0%	3.3%
5	Count	0	0	2	2	4
	Row %	0.0%	0.0%	50.0%	50.0%	100.0%
	Col %	0.0%	0.0%	9.1%	8.3%	4.3%
Total	Count	18	28	22	24	92
	Row %	19.6%	30.4%	23.9%	26.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%
O2. Statistics	Mean	1.6	1.4	1.7	1.7	1.6
	Median	1.0	1.0	1.0	1.0	1.0

O2a. How many people currently live in your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
1	Count	47	22	30	36	135
	Row %	34.8%	16.3%	22.2%	26.7%	100.0%
	Col %	32.2%	14.8%	20.0%	24.0%	22.7%
2	Count	35	32	34	31	132
	Row %	26.5%	24.2%	25.8%	23.5%	100.0%
	Col %	24.0%	21.5%	22.7%	20.7%	22.2%
3	Count	16	23	18	22	79
	Row %	20.3%	29.1%	22.8%	27.8%	100.0%
	Col %	11.0%	15.4%	12.0%	14.7%	13.3%
4	Count	19	33	30	24	106
	Row %	17.9%	31.1%	28.3%	22.6%	100.0%
	Col %	13.0%	22.1%	20.0%	16.0%	17.8%
5	Count	10	15	23	17	65
	Row %	15.4%	23.1%	35.4%	26.2%	100.0%
	Col %	6.8%	10.1%	15.3%	11.3%	10.9%
6	Count	13	16	9	12	50
	Row %	26.0%	32.0%	18.0%	24.0%	100.0%
	Col %	8.9%	10.7%	6.0%	8.0%	8.4%
7	Count	5	4	3	3	15
	Row %	33.3%	26.7%	20.0%	20.0%	100.0%
	Col %	3.4%	2.7%	2.0%	2.0%	2.5%
8	Count	1	3	2	2	8
	Row %	12.5%	37.5%	25.0%	25.0%	100.0%
	Col %	0.7%	2.0%	1.3%	1.3%	1.3%

9	Count	0	1	1	1	3
	Row %	0.0%	33.3%	33.3%	33.3%	100.0%
	Col %	0.0%	0.7%	0.7%	0.7%	0.5%
10	Count	0	0	0	2	2
	Row %	0.0%	0.0%	0.0%	100.0%	100.0%
	Col %	0.0%	0.0%	0.0%	1.3%	0.3%
Total	Count	146	149	150	150	595
	Row %	24.5%	25.0%	25.2%	25.2%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%
O22. Statistics	Mean	2.8	3.5	3.2	3.2	3.2
	Median	2.0	3.0	3.0	3.0	3.0

O3. How many people over the age of 65 currently live in your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
0	Count	77	89	77	86	329
	Row %	23.4%	27.1%	23.4%	26.1%	100.0%
	Col %	52.0%	59.7%	51.7%	57.3%	55.2%
1	Count	50	40	50	50	190
	Row %	26.3%	21.1%	26.3%	26.3%	100.0%
	Col %	33.8%	26.8%	33.6%	33.3%	31.9%
2	Count	20	19	22	12	73
	Row %	27.4%	26.0%	30.1%	16.4%	100.0%
	Col %	13.5%	12.8%	14.8%	8.0%	12.2%
3	Count	1	1	0	2	4
	Row %	25.0%	25.0%	0.0%	50.0%	100.0%
	Col %	0.7%	0.7%	0.0%	1.3%	0.7%
Total	Count	148	149	149	150	596
	Row %	24.8%	25.0%	25.0%	25.2%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%
O3. Statistics	Mean	.6	.5	.6	.5	.6
	Median	.0	.0	.0	.0	.0

O4. How many people under the age of 2 currently live in your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
0	Count	103	108	103	112	426
	Row %	24.2%	25.4%	24.2%	26.3%	100.0%
	Col %	88.8%	83.1%	88.8%	91.1%	87.8%
1	Count	10	17	10	11	48
	Row %	20.8%	35.4%	20.8%	22.9%	100.0%
	Col %	8.6%	13.1%	8.6%	8.9%	9.9%
2	Count	1	4	3	0	8
	Row %	12.5%	50.0%	37.5%	0.0%	100.0%
	Col %	0.9%	3.1%	2.6%	0.0%	1.6%
3	Count	1	1	0	0	2
	Row %	50.0%	50.0%	0.0%	0.0%	100.0%
	Col %	0.9%	0.8%	0.0%	0.0%	0.4%
6	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	0.9%	0.0%	0.0%	0.0%	0.2%
Total	Count	116	130	116	123	485
	Row %	23.9%	26.8%	23.9%	25.4%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%
O4. Statistics	Mean	.2	.2	.1	.1	.2
	Median	.0	.0	.0	.0	.0

O5. Has the number of people that stay at home during the day changed since you participated in the ESA program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes, increased	Count	14	16	18	14	62
	Row %	22.6%	25.8%	29.0%	22.6%	100.0%
	Col %	9.5%	10.7%	12.2%	9.5%	10.5%
No	Count	132	128	122	125	507
	Row %	26.0%	25.2%	24.1%	24.7%	100.0%
	Col %	89.8%	85.9%	83.0%	84.5%	85.8%
Yes, decreased	Count	1	5	7	9	22
	Row %	4.5%	22.7%	31.8%	40.9%	100.0%
	Col %	0.7%	3.4%	4.8%	6.1%	3.7%
Total	Count	147	149	147	148	591
	Row %	24.9%	25.2%	24.9%	25.0%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

O6_1. How many more people stay at home during the day since you participated in the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
1	Count	12	6	11	7	36
	Row %	33.3%	16.7%	30.6%	19.4%	100.0%
	Col %	85.7%	37.5%	64.7%	50.0%	59.0%
2	Count	2	7	3	1	13
	Row %	15.4%	53.8%	23.1%	7.7%	100.0%
	Col %	14.3%	43.8%	17.6%	7.1%	21.3%
3	Count	0	3	2	2	7
	Row %	0.0%	42.9%	28.6%	28.6%	100.0%
	Col %	0.0%	18.8%	11.8%	14.3%	11.5%
4	Count	0	0	1	4	5
	Row %	0.0%	0.0%	20.0%	80.0%	100.0%
	Col %	0.0%	0.0%	5.9%	28.6%	8.2%
Total	Count	14	16	17	14	61
	Row %	23.0%	26.2%	27.9%	23.0%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%
O6_1. Statistics	Mean	1.1	1.8	1.6	2.2	1.7
	Median	1.0	2.0	1.0	1.5	1.0

O6_2. How many fewer people stay at home during the day since you participated in the ESA Program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
1	Count	1	3	4	8	16
	Row %	6.2%	18.8%	25.0%	50.0%	100.0%
	Col %	100.0%	60.0%	57.1%	88.9%	72.7%
2	Count	0	2	2	1	5
	Row %	0.0%	40.0%	40.0%	20.0%	100.0%
	Col %	0.0%	40.0%	28.6%	11.1%	22.7%
3	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	14.3%	0.0%	4.5%
Total	Count	1	5	7	9	22
	Row %	4.5%	22.7%	31.8%	40.9%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%
O6_2. Statistics	Mean	1.0	1.4	1.6	1.1	1.3
	Median	1.0	1.0	1.0	1.0	1.0

O7_1. What is the reason for more people staying at home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Lost job	Count	0	4	4	2	10
	Row %	0.0%	40.0%	40.0%	20.0%	100.0%
	Col %	0.0%	25.0%	22.2%	14.3%	16.1%
Caring for children/New baby	Count	4	9	4	4	21
	Row %	19.0%	42.9%	19.0%	19.0%	100.0%
	Col %	28.6%	56.2%	22.2%	28.6%	33.9%
Elderly parents moved in	Count	1	0	2	2	5
	Row %	20.0%	0.0%	40.0%	40.0%	100.0%
	Col %	7.1%	0.0%	11.1%	14.3%	8.1%
Working at home more	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	6.2%	0.0%	0.0%	1.6%
Retired	Count	2	1	3	0	6
	Row %	33.3%	16.7%	50.0%	0.0%	100.0%
	Col %	14.3%	6.2%	16.7%	0.0%	9.7%
Disabled	Count	2	0	2	1	5
	Row %	40.0%	0.0%	40.0%	20.0%	100.0%
	Col %	14.3%	0.0%	11.1%	7.1%	8.1%
adult kids/other people moved in	Count	3	1	4	5	13
	Row %	23.1%	7.7%	30.8%	38.5%	100.0%
	Col %	21.4%	6.2%	22.2%	35.7%	21.0%
going to school/worked at night now	Count	1	1	0	1	3
	Row %	33.3%	33.3%	0.0%	33.3%	100.0%
	Col %	7.1%	6.2%	0.0%	7.1%	4.8%

kids graduated/out of school/now home more	Count	1	2	0	0	3
	Row %	33.3%	66.7%	0.0%	0.0%	100.0%
	Col %	7.1%	12.5%	0.0%	0.0%	4.8%
Family moving	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	6.2%	0.0%	0.0%	1.6%
visitors stay at the place during the day	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	5.6%	0.0%	1.6%
Refused	Count	0	0	1	1	2
	Row %	0.0%	0.0%	50.0%	50.0%	100.0%
	Col %	0.0%	0.0%	5.6%	7.1%	3.2%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	14	16	18	14	62
	Row %	22.6%	25.8%	29.0%	22.6%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

O7_2. What is the reason for fewer people staying at home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Found a job	Count	0	2	4	2	8
	Row %	0.0%	25.0%	50.0%	25.0%	100.0%
	Col %	0.0%	40.0%	57.1%	22.2%	36.4%
Went back to school	Count	0	2	1	6	9
	Row %	0.0%	22.2%	11.1%	66.7%	100.0%
	Col %	0.0%	40.0%	14.3%	66.7%	40.9%
people moved out	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	14.3%	0.0%	4.5%
Died	Count	1	0	2	1	4
	Row %	25.0%	0.0%	50.0%	25.0%	100.0%
	Col %	100.0%	0.0%	28.6%	11.1%	18.2%
change of work schedule/work nights	Count	0	0	0	1	1
	Row %	0.0%	0.0%	0.0%	100.0%	100.0%
	Col %	0.0%	0.0%	0.0%	11.1%	4.5%
Refused	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Other (Specify)	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
Don't Know	Count	0	1	0	0	1
	Row %	0.0%	100.0%	0.0%	0.0%	100.0%
	Col %	0.0%	20.0%	0.0%	0.0%	4.5%
Total	Count	1	5	7	9	22
	Row %	4.5%	22.7%	31.8%	40.9%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

HC1. When was your home built? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
In the last 10 years (since 2000)	Count	12	9	6	10	37
	Row %	32.4%	24.3%	16.2%	27.0%	100.0%
	Col %	8.9%	6.9%	4.6%	8.6%	7.2%
In the 1990's	Count	8	15	11	9	43
	Row %	18.6%	34.9%	25.6%	20.9%	100.0%
	Col %	5.9%	11.5%	8.5%	7.8%	8.4%
In the 1980's	Count	23	22	20	21	86
	Row %	26.7%	25.6%	23.3%	24.4%	100.0%
	Col %	17.0%	16.9%	15.4%	18.1%	16.8%
In the 1970's	Count	18	23	14	30	85
	Row %	21.2%	27.1%	16.5%	35.3%	100.0%
	Col %	13.3%	17.7%	10.8%	25.9%	16.6%
In the 1960's	Count	19	20	18	17	74
	Row %	25.7%	27.0%	24.3%	23.0%	100.0%
	Col %	14.1%	15.4%	13.8%	14.7%	14.5%
In the 1950's	Count	20	23	34	16	93
	Row %	21.5%	24.7%	36.6%	17.2%	100.0%
	Col %	14.8%	17.7%	26.2%	13.8%	18.2%
In the 1940's	Count	14	10	13	6	43
	Row %	32.6%	23.3%	30.2%	14.0%	100.0%
	Col %	10.4%	7.7%	10.0%	5.2%	8.4%
Before 1940	Count	21	8	14	7	50
	Row %	42.0%	16.0%	28.0%	14.0%	100.0%
	Col %	15.6%	6.2%	10.8%	6.0%	9.8%
Total	Count	135	130	130	116	511
	Row %	26.4%	25.4%	25.4%	22.7%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

HC2. Which of the following categories includes the size of your home? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Less than 500 square feet	Count	10	9	4	10	33
	Row %	30.3%	27.3%	12.1%	30.3%	100.0%
	Col %	6.7%	6.0%	2.6%	6.6%	5.5%
Between 500 and 1000 square feet	Count	28	24	23	31	106
	Row %	26.4%	22.6%	21.7%	29.2%	100.0%
	Col %	18.7%	16.0%	15.2%	20.5%	17.6%
Between 1000 and 1500 square feet	Count	45	49	41	39	174
	Row %	25.9%	28.2%	23.6%	22.4%	100.0%
	Col %	30.0%	32.7%	27.2%	25.8%	28.9%
Between 1500 and 2000 square feet	Count	28	21	28	27	104
	Row %	26.9%	20.2%	26.9%	26.0%	100.0%
	Col %	18.7%	14.0%	18.5%	17.9%	17.3%
Between 2000 and 2500 square feet	Count	6	7	6	2	21
	Row %	28.6%	33.3%	28.6%	9.5%	100.0%
	Col %	4.0%	4.7%	4.0%	1.3%	3.5%
Between 2500 and 3000 square feet	Count	4	1	3	3	11
	Row %	36.4%	9.1%	27.3%	27.3%	100.0%
	Col %	2.7%	0.7%	2.0%	2.0%	1.8%
More than 3,000 square feet	Count	0	2	1	1	4
	Row %	0.0%	50.0%	25.0%	25.0%	100.0%
	Col %	0.0%	1.3%	0.7%	0.7%	0.7%

Refused	Count	1	1	2	3	7
	Row %	14.3%	14.3%	28.6%	42.9%	100.0%
	Col %	0.7%	0.7%	1.3%	2.0%	1.2%
Don't Know	Count	28	36	43	35	142
	Row %	19.7%	25.4%	30.3%	24.6%	100.0%
	Col %	18.7%	24.0%	28.5%	23.2%	23.6%
Total	Count	150	150	151	151	602
	Row %	24.9%	24.9%	25.1%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

HC3. Have you done any remodeling or renovating since the program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes	Count	12	20	14	27	73
	Row %	16.4%	27.4%	19.2%	37.0%	100.0%
	Col %	8.1%	13.4%	9.5%	18.4%	12.3%
No	Count	137	129	134	120	520
	Row %	26.3%	24.8%	25.8%	23.1%	100.0%
	Col %	91.9%	86.6%	90.5%	81.6%	87.7%
Total	Count	149	149	148	147	593
	Row %	25.1%	25.1%	25.0%	24.8%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

HC4. Did Square Footage increase or decrease? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Yes, Increased	Count	1	3	1	2	7
	Row %	14.3%	42.9%	14.3%	28.6%	100.0%
	Col %	8.3%	15.0%	7.1%	7.4%	9.6%
Yes, Decreased	Count	0	0	0	0	0
	Row %	0.0%	0.0%	0.0%	0.0%	0.0%
	Col %	0.0%	0.0%	0.0%	0.0%	0.0%
No	Count	11	17	13	25	66
	Row %	16.7%	25.8%	19.7%	37.9%	100.0%
	Col %	91.7%	85.0%	92.9%	92.6%	90.4%
Total	Count	12	20	14	27	73
	Row %	16.4%	27.4%	19.2%	37.0%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

HC5. Since you participated in the ESA program, has your total household income increased, decreased, or has there been no change? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Increase	Count	19	11	14	16	60
	Row %	31.7%	18.3%	23.3%	26.7%	100.0%
	Col %	12.9%	7.5%	9.7%	10.9%	10.3%
Decrease	Count	31	29	31	35	126
	Row %	24.6%	23.0%	24.6%	27.8%	100.0%
	Col %	21.1%	19.9%	21.4%	23.8%	21.5%
No Change	Count	97	106	100	96	399
	Row %	24.3%	26.6%	25.1%	24.1%	100.0%
	Col %	66.0%	72.6%	69.0%	65.3%	68.2%
Total	Count	147	146	145	147	585
	Row %	25.1%	25.0%	24.8%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

HC6. Is there anything else that has occurred since you participated in the ESA program? BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Replaced windows/doors	Count	1	2	1	2	6
	Row %	16.7%	33.3%	16.7%	33.3%	100.0%
	Col %	0.7%	1.3%	0.7%	1.3%	1.0%
Replaced or added light fixtures/bulbs/CFLs	Count	1	1	0	1	3
	Row %	33.3%	33.3%	0.0%	33.3%	100.0%
	Col %	0.7%	0.7%	0.0%	0.7%	0.5%
Need weatherstripping/old not working	Count	1	1	0	2	4
	Row %	25.0%	25.0%	0.0%	50.0%	100.0%
	Col %	0.7%	0.7%	0.0%	1.3%	0.7%
Some appliances/equip old/not working	Count	2	0	2	0	4
	Row %	50.0%	0.0%	50.0%	0.0%	100.0%
	Col %	1.3%	0.0%	1.3%	0.0%	0.7%
Use fans/space heaters, don't use AC/central	Count	1	2	3	0	6
	Row %	16.7%	33.3%	50.0%	0.0%	100.0%
	Col %	0.7%	1.3%	2.0%	0.0%	1.0%
Installed weatherstripping, insulation, etc.	Count	3	0	2	1	6
	Row %	50.0%	0.0%	33.3%	16.7%	100.0%
	Col %	2.0%	0.0%	1.3%	0.7%	1.0%
Don't use space heaters	Count	0	1	2	0	3
	Row %	0.0%	33.3%	66.7%	0.0%	100.0%
	Col %	0.0%	0.7%	1.3%	0.0%	0.5%
More/fewer people in home/home more/less	Count	0	0	1	1	2
	Row %	0.0%	0.0%	50.0%	50.0%	100.0%
	Col %	0.0%	0.0%	0.7%	0.7%	0.3%

Added appliances/items	Count	1	4	1	2	8
	Row %	12.5%	50.0%	12.5%	25.0%	100.0%
	Col %	0.7%	2.7%	0.7%	1.3%	1.3%
Removed appliances/items	Count	0	0	0	1	1
	Row %	0.0%	0.0%	0.0%	100.0%	100.0%
	Col %	0.0%	0.0%	0.0%	0.7%	0.2%
Making effort to save energy	Count	0	3	0	1	4
	Row %	0.0%	75.0%	0.0%	25.0%	100.0%
	Col %	0.0%	2.0%	0.0%	0.7%	0.7%
Got smart Meter	Count	1	0	0	0	1
	Row %	100.0%	0.0%	0.0%	0.0%	100.0%
	Col %	0.7%	0.0%	0.0%	0.0%	0.2%
Got smart thermostat	Count	1	0	1	0	2
	Row %	50.0%	0.0%	50.0%	0.0%	100.0%
	Col %	0.7%	0.0%	0.7%	0.0%	0.3%
Got new fuse box	Count	0	2	1	0	3
	Row %	0.0%	66.7%	33.3%	0.0%	100.0%
	Col %	0.0%	1.3%	0.7%	0.0%	0.5%
Gotten seriously ill	Count	0	0	1	0	1
	Row %	0.0%	0.0%	100.0%	0.0%	100.0%
	Col %	0.0%	0.0%	0.7%	0.0%	0.2%
Nothing else	Count	137	133	136	139	545
	Row %	25.1%	24.4%	25.0%	25.5%	100.0%
	Col %	91.3%	88.7%	90.1%	92.1%	90.5%
Refused	Count	1	1	0	1	3
	Row %	33.3%	33.3%	0.0%	33.3%	100.0%
	Col %	0.7%	0.7%	0.0%	0.7%	0.5%
Total	Count	150	150	151	151	602
	Row %	24.9%	24.9%	25.1%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

INTERVIEWER: RECORD GENDER BY Utility

		Utility				
		PG&E	SCE	SCG	SDG&E	Total
Male	Count	53	49	64	48	214
	Row %	24.8%	22.9%	29.9%	22.4%	100.0%
	Col %	35.3%	32.7%	42.4%	31.8%	35.5%
Female	Count	97	101	87	103	388
	Row %	25.0%	26.0%	22.4%	26.5%	100.0%
	Col %	64.7%	67.3%	57.6%	68.2%	64.5%
Total	Count	150	150	151	151	602
	Row %	24.9%	24.9%	25.1%	25.1%	100.0%
	Col %	100.0%	100.0%	100.0%	100.0%	100.0%

Appendix C: Billing Regression Model Output

This section includes the regression output for the Basic, Measure, and Whole House models discussed in the main report.

Table 1: SDG&E Basic Model Regression Regults (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.34	0.00	129.12	0.00	179.08
CDD	0.80	0.01	129.90	0.00	70.56
RoomAC	-8.33	3.62	-2.30	0.02	0.01
DuctTestSeal	-20.88	3.92	-5.32	0.00	0.03
ClothesWasher	-10.25	1.32	-7.78	0.00	0.04
HardwiredLighting	-2.88	0.77	-3.72	0.00	0.16
Insulation	-23.10	4.99	-4.63	0.00	0.02
Lighting	-3.08	0.70	-4.39	0.00	0.48
Microwave	3.29	1.07	3.09	0.00	0.04
Refrigerator	-53.37	1.30	-41.10	0.00	0.04
HWConservation	-7.10	1.30	-5.47	0.00	0.41
WHRepairReplace	0.87	1.46	0.60	0.55	0.03
Weatherization	7.95	1.60	4.96	0.00	0.39
RoomAC*CDD	0.06	0.02	3.16	0.00	0.70
DuctTestSeal*CDD	0.23	0.02	9.97	0.00	2.11
DuctTestSeal*HDD	0.00	0.01	0.18	0.86	4.20
Insulation*CDD	0.05	0.03	1.79	0.07	1.69
Insulation*HDD	0.07	0.02	3.73	0.00	3.46
Weatherization*CDD	0.01	0.01	0.68	0.49	32.08
Weatherization*HDD	0.00	0.00	0.46	0.65	64.18
Adjusted R-squared	0.80				

Table 2: PG&E Basic Model Regression Results (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.65	0.00	465.37	0.00	235.37
CDD	1.26	0.00	705.99	0.00	112.20
CentralAC	49.86	12.00	4.16	0.00	0.00
CentralACTuneUp	-31.02	0.94	-33.18	0.00	0.05
CFL	7.66	0.69	11.17	0.00	0.45
DuctTestSeal	-15.88	1.27	-12.48	0.00	0.02
EvaporativeCooler	-27.44	1.57	-17.53	0.00	0.03
HardwiredLighting	-0.15	0.60	-0.26	0.80	0.40
Insulation	-0.79	2.04	-0.39	0.70	0.03
Lighting*	-0.06	0.54	-0.12	0.91	0.12
Refrigerator	-54.61	0.68	-79.80	0.00	0.07
RoomAC	50.82	2.01	25.26	0.00	0.01
HWConservation	2.38	0.56	4.27	0.00	0.35
Weatherization	45.06	0.87	52.01	0.00	0.30
CentralAC*CDD	-0.30	0.04	-8.45	0.00	2.57
CentralACTuneUp*CDD	0.32	0.00	96.42	0.00	9.29
Duct Test Seal *CDD	0.08	0.01	9.55	0.00	3.27
EvaporativeCooler*CDD	0.19	0.00	44.67	0.00	5.71
Insulation*CDD	-0.09	0.01	-11.07	0.00	3.06
Insulation*HDD	-0.01	0.01	-2.17	0.03	6.56
RoomAC*CDD	-0.28	0.01	-43.96	0.00	2.47
Weatherization*CDD	-0.08	0.00	-29.27	0.00	36.14
Weatherization*HDD	-0.16	0.00	-69.20	0.00	64.71
Adjusted R-squared	0.79				

*Occupancy Sensor, Torchiere

Table 3: SCE Basic Model Regression Results

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
CDD	1.26	0.00	800.97	0.00	126.32
HDD	0.47	0.00	396.84	0.00	183.32
RoomAC	54.68	3.16	17.32	0.00	0.00
CentralAC	-41.42	5.38	-7.71	0.00	0.03
CFL	-5.94	0.28	-20.88	0.00	0.35
DuctTestSeal	-19.71	6.23	-3.17	0.00	0.02
EvaporativeCooler	-7.84	0.87	-9.01	0.00	0.08
Lighting	-3.23	1.23	-2.62	0.01	0.02
PoolPump	-40.74	2.91	-14.02	0.00	0.01
Refrigerator	-64.50	0.55	-116.72	0.00	0.08
HW Conservation	-60.08	7.21	-8.33	0.00	0.00
Weatherization	-62.70	7.71	-8.13	0.00	0.00
CentralACTuneUp	-16.59	17.30	-0.96	0.34	0.00
RoomAC*CDD	-0.24	0.01	-24.64	0.00	0.92
CentralAC*CDD	0.09	0.01	8.01	0.00	6.12
Duct Test Seal*CDD	0.02	0.01	1.88	0.06	5.55
Duct Test Seal*HDD	0.16	0.01	21.55	0.00	4.61
EvaporativeCooler*CDD	-0.07	0.00	-24.19	0.00	16.41
PoolPump*CDD	0.41	0.01	43.69	0.00	1.99
Weatherization*CDD	-0.23	0.02	-9.64	0.00	0.55
Weatherization*HDD	0.59	0.02	24.48	0.00	0.62
CentralACTuneUp*CDD	0.19	0.04	5.26	0.00	0.06
Adjusted R-squared	0.77				

Table 4: SDG&E Basic Model Regression Results (Gas)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.07	0.00	322.74	0.00	177.79
DuctTestSeal	-3.80	0.22	-17.45	0.00	0.04
FurnaceRepairReplace	-0.08	0.13	-0.57	0.57	0.14
FurnaceCleanTune	-4.52	0.12	-36.67	0.00	0.26
ClothesWasher	-1.32	0.12	-10.89	0.00	0.06
Insulation	-4.19	0.25	-16.94	0.00	0.03
FurnacePilotLight	-1.26	0.16	-8.08	0.00	0.03
HWConservation	0.51	0.12	4.31	0.00	0.44
WHRepairReplace	-0.57	0.14	-4.02	0.00	0.05
Weatherization	2.28	0.15	15.16	0.00	0.39
DuctTestSeal*HDD	0.01	0.00	16.88	0.00	6.58
FurnaceRepairReplace*HDD	0.01	0.00	11.90	0.00	22.95
FurnaceCleanTune*HDD	0.02	0.00	41.97	0.00	42.74
Insulation*HDD	0.01	0.00	11.16	0.00	5.22
Weatherization*HDD	-0.01	0.00	-33.81	0.00	64.97
Adjusted R-squared	0.65				

Table 5: PG&E Basic Model Regression Results (Gas)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.11	0.00	1078.89	0.00	232.38
Duct Test Seal	-8.34	0.17	-48.22	0.00	0.02
Furnace Repair	3.20	0.19	16.87	0.00	0.01
Furnace Replace	3.42	0.25	13.77	0.00	0.01
Insulation	-5.37	0.12	-44.69	0.00	0.04
HWConservation	0.30	0.05	6.52	0.00	0.41
WHRepair/Replace	-0.46	0.31	-1.51	0.13	0.01
Weatherization	1.40	0.06	21.51	0.00	0.36
DuctTestSeal*HDD	0.03	0.00	57.27	0.00	4.35
FurnaceRepair*HDD	0.00	0.00	0.52	0.61	2.61
FurnaceReplace*HDD	0.00	0.00	-1.89	0.06	1.56
Insulation*HDD	0.01	0.00	19.51	0.00	8.36
Weatherization*HDD	-0.01	0.00	-31.13	0.00	78.56
Adjusted R-squared	0.81				

Table 6: SCG Basic Model Regression Results

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Variable Mean
HDD	0.10	0.00	1197.08	0.00	177.35
DuctTestSeal	-4.37	0.15	-28.87	0.00	0.01
FurnaceRepairReplace	2.40	0.06	41.25	0.00	0.06
FurnaceCleanTune	-3.98	0.05	-72.76	0.00	0.09
ClothesWasher	-2.57	0.10	-26.45	0.00	0.01
Insulation	-3.40	0.08	-40.73	0.00	0.04
HWConservation	-0.28	0.05	-5.76	0.00	0.50
WHRepairReplace	-0.29	0.18	-1.61	0.11	0.01
Weatherization	2.13	0.05	39.25	0.00	0.47
DuctTestSeal*HDD	0.02	0.00	29.05	0.00	1.80
FurnaceRepairReplace*HDD	0.01	0.00	27.79	0.00	9.35
FurnaceCleanTune*HDD	0.02	0.00	95.64	0.00	15.30
Insulation*HDD	0.01	0.00	21.37	0.00	5.98
Weatherization*HDD	-0.01	0.00	-111.63	0.00	77.42
Adjusted R-squared	0.67				

Table 7:SDG&E Single-Family Whole House Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	-7.11	1.40	-5.09	0.00	0.53
HDD	0.14	0.01	16.85	0.00	151.99
CDD	0.68	0.02	40.15	0.00	41.29
POST*HDD	-0.02	0.01	-2.74	0.01	74.00
POST*CDD	-0.09	0.02	-5.20	0.00	27.47
FEBRUARY	-17.53	1.28	-13.72	0.00	0.08
MARCH	-42.63	1.31	-32.59	0.00	0.09
APRIL	-49.26	1.66	-29.60	0.00	0.08
MAY	-43.38	1.90	-22.88	0.00	0.09
JUNE	-34.68	2.29	-15.14	0.00	0.09
JULY	-28.18	2.44	-11.54	0.00	0.08
AUGUST	-23.25	2.50	-9.30	0.00	0.09
SEPTEMBER	-32.11	2.30	-13.94	0.00	0.08
OCTOBER	-35.03	1.76	-19.85	0.00	0.09
NOVEMBER	19.31	1.28	15.10	0.00	0.08
DECEMBER	46.47	1.37	34.04	0.00	0.06
Adjusted R-squared	0.80				

Table 8: SDG&E Multi-Family Whole House Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	1.02	0.86	1.18	0.24	0.49
HDD	0.06	0.00	11.85	0.00	148.68
CDD	0.55	0.01	57.70	0.00	42.09
POST*HDD	0.00	0.00	-0.85	0.39	67.53
POST*CDD	-0.10	0.01	-10.41	0.00	26.31
FEBRUARY	-9.16	0.87	-10.55	0.00	0.07
MARCH	-29.04	0.86	-33.63	0.00	0.09
APRIL	-35.35	1.07	-33.03	0.00	0.08
MAY	-30.10	1.19	-25.36	0.00	0.09
JUNE	-31.54	1.41	-22.44	0.00	0.09
JULY	-27.23	1.49	-18.27	0.00	0.08
AUGUST	-24.85	1.51	-16.42	0.00	0.09
SEPTEMBER	-30.99	1.40	-22.07	0.00	0.08
OCTOBER	-28.40	1.10	-25.80	0.00	0.09
NOVEMBER	10.19	0.86	11.85	0.00	0.08
DECEMBER	24.43	0.90	27.29	0.00	0.07
Adjusted R-squared	0.74				

Table 9: SDG&E Mobile Whole House Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	-3.64	6.02	-0.61	0.55	0.51
HDD	0.11	0.03	3.36	0.00	146.89
CDD	1.05	0.06	16.90	0.00	49.30
POST*HDD	-0.04	0.03	-1.71	0.09	67.96
POST*CDD	-0.13	0.06	-2.13	0.03	33.19
FEBRUARY	-5.91	6.41	-0.92	0.36	0.07
MARCH	-30.86	6.18	-4.99	0.00	0.09
APRIL	-45.73	7.44	-6.15	0.00	0.08
MAY	-41.57	8.28	-5.02	0.00	0.09
JUNE	-30.44	9.51	-3.20	0.00	0.09
JULY	-21.10	9.93	-2.13	0.03	0.09
AUGUST	-12.23	10.22	-1.20	0.23	0.09
SEPTEMBER	-41.68	10.01	-4.16	0.00	0.08
OCTOBER	-34.91	7.86	-4.44	0.00	0.10
NOVEMBER	13.47	6.55	2.06	0.04	0.07
DECEMBER	46.00	6.24	7.37	0.00	0.07
Adjusted R-squared	0.76				

Table 10: PG&E Single Family Whole House Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	28.72	0.82	35.21	0.00	0.51
HDD	0.43	0.00	154.39	0.00	234.19
CDD	1.28	0.00	524.03	0.00	114.25
POST*HDD	-0.10	0.00	-41.73	0.00	111.98
POST*CDD	-0.07	0.00	-25.06	0.00	63.76
FEBRUARY	-18.02	0.65	-27.77	0.00	0.08
MARCH	-42.59	0.67	-63.57	0.00	0.09
APRIL	-85.21	0.76	-111.42	0.00	0.08
MAY	-81.13	0.82	-98.99	0.00	0.08
JUNE	-60.84	0.88	-68.97	0.00	0.09
JULY	-40.53	0.89	-45.58	0.00	0.08
AUGUST	-71.44	0.89	-80.49	0.00	0.09
SEPTEMBER	-88.49	0.89	-99.38	0.00	0.08
OCTOBER	-47.23	0.75	-62.99	0.00	0.09
NOVEMBER	33.82	0.64	52.53	0.00	0.08
DECEMBER	62.53	0.67	93.74	0.00	0.07
Adjusted R-squared	0.77				

Table 11: PG&E Multi-Family Whole House Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	14.27	1.17	12.16	0.00	0.52
HDD	0.25	0.00	61.50	0.00	239.93
CDD	1.11	0.00	238.06	0.00	93.07
POST*HDD	-0.05	0.00	-15.79	0.00	117.72
POST*CDD	-0.08	0.01	-14.92	0.00	52.74
FEBRUARY	-11.15	0.88	-12.74	0.00	0.08
MARCH	-29.86	0.89	-33.60	0.00	0.09
APRIL	-57.26	1.00	-57.23	0.00	0.08
MAY	-64.42	1.08	-59.66	0.00	0.09
JUNE	-80.88	1.19	-67.90	0.00	0.09
JULY	-68.97	1.20	-57.52	0.00	0.08
AUGUST	-85.76	1.19	-71.91	0.00	0.09
SEPTEMBER	-80.27	1.20	-66.83	0.00	0.08
OCTOBER	-37.07	1.01	-36.79	0.00	0.09
NOVEMBER	15.81	0.88	17.90	0.00	0.08
DECEMBER	36.39	0.90	40.59	0.00	0.08
Adjusted R-squared	0.78				

Table 12: PG&E Mobile Home Whole House Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	55.94	5.64	9.92	0.00	0.52
HDD	0.55	0.02	34.93	0.00	240.95
CDD	0.97	0.01	67.20	0.00	144.67
POST*HDD	-0.14	0.01	-9.70	0.00	116.21
POST*CDD	-0.14	0.02	-8.71	0.00	82.65
FEBRUARY	-15.27	4.04	-3.78	0.00	0.08
MARCH	-36.71	4.24	-8.65	0.00	0.09
APRIL	-99.27	4.95	-20.05	0.00	0.08
MAY	-89.83	5.34	-16.81	0.00	0.09
JUNE	-56.40	6.02	-9.37	0.00	0.09
JULY	-35.65	6.16	-5.79	0.00	0.08
AUGUST	-74.94	6.06	-12.37	0.00	0.09
SEPTEMBER	-99.57	5.69	-17.49	0.00	0.08
OCTOBER	-54.96	4.70	-11.69	0.00	0.09
NOVEMBER	41.08	3.98	10.32	0.00	0.08
DECEMBER	78.39	4.11	19.09	0.00	0.07
Adjusted R-squared	0.87				

Table 13: SCE Single Family Whole House Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	-16.15	0.73	-22.25	0.00	0.42
HDD	0.38	0.00	143.71	0.00	185.46
CDD	1.27	0.00	480.80	0.00	131.36
POST*HDD	0.00	0.00	0.30	0.76	74.82
POST*CDD	-0.05	0.00	-16.90	0.00	64.60
FEBRUARY	-38.73	0.63	-61.80	0.00	0.08
MARCH	-52.82	0.61	-86.31	0.00	0.09
APRIL	-78.04	0.66	-117.53	0.00	0.09
MAY	-84.63	0.76	-111.59	0.00	0.08
JUNE	-68.45	0.82	-83.65	0.00	0.09
JULY	-56.25	0.88	-63.78	0.00	0.08
AUGUST	-41.55	0.90	-46.28	0.00	0.09
SEPTEMBER	-66.19	0.92	-72.30	0.00	0.08
OCTOBER	-82.40	0.88	-93.59	0.00	0.08
NOVEMBER	-71.06	0.77	-92.76	0.00	0.08
DECEMBER	2.06	0.62	3.31	0.00	0.09
Adjusted R-squared	0.76				

Table 14: SCE Multi-Family Whole House Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	-19.21	1.03	-18.58	0.00	0.26
HDD	0.13	0.00	36.31	0.00	168.23
CDD	0.87	0.00	210.61	0.00	92.23
POST*HDD	-0.02	0.00	-5.60	0.00	42.54
POST*CDD	-0.03	0.01	-6.17	0.00	30.41
FEBRUARY	-25.59	0.77	-33.21	0.00	0.07
MARCH	-27.00	0.74	-36.29	0.00	0.09
APRIL	-43.34	0.81	-53.50	0.00	0.09
MAY	-47.46	0.93	-51.10	0.00	0.08
JUNE	-35.95	1.01	-35.48	0.00	0.09
JULY	-38.62	1.12	-34.52	0.00	0.09
AUGUST	-45.11	1.15	-39.14	0.00	0.09
SEPTEMBER	-64.78	1.19	-54.58	0.00	0.08
OCTOBER	-65.84	1.13	-58.14	0.00	0.08
NOVEMBER	-53.90	0.97	-55.76	0.00	0.08
DECEMBER	1.18	0.77	1.53	0.13	0.09
Adjusted R-squared	0.81				

Table 15: SCE Mobile Home Whole House Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	-7.55	3.99	-1.89	0.06	0.46
HDD	0.61	0.01	49.62	0.00	206.44
CDD	1.06	0.01	97.30	0.00	174.59
POST*HDD	-0.06	0.01	-5.03	0.00	90.71
POST*CDD	-0.02	0.01	-1.90	0.06	91.23
FEBRUARY	-14.89	3.19	-4.67	0.00	0.08
MARCH	-24.40	3.12	-7.82	0.00	0.09
APRIL	-28.64	3.38	-8.48	0.00	0.09
MAY	-8.06	3.87	-2.08	0.04	0.08
JUNE	23.56	4.17	5.65	0.00	0.09
JULY	89.40	4.75	18.83	0.00	0.08
AUGUST	140.76	4.99	28.23	0.00	0.09
SEPTEMBER	114.85	5.10	22.51	0.00	0.08
OCTOBER	47.38	4.67	10.15	0.00	0.08
NOVEMBER	0.20	3.86	0.05	0.96	0.08
DECEMBER	9.23	3.12	2.96	0.00	0.09
Adjusted R-squared	0.76				

Table 16: SDG&E Single Family Whole House Model (Gas)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	-1.68	1,203.11	0.00	1.00	0.47
HDD	0.05	60.00	0.00	1.00	150.16
POST*HDD	0.01	4.32	0.00	1.00	64.07
FEBRUARY	-2.97	3,373.01	0.00	1.00	0.08
MARCH	-7.07	6,569.51	0.00	1.00	0.09
APRIL	-8.64	12,229.39	0.00	1.00	0.08
MAY	-9.48	15,130.79	0.00	1.00	0.09
JUNE	-9.23	19,428.60	0.00	1.00	0.09
JULY	-9.92	20,444.39	0.00	1.00	0.08
AUGUST	-10.66	20,849.02	0.00	1.00	0.09
SEPTEMBER	-10.39	18,944.49	0.00	1.00	0.08
OCTOBER	-8.80	13,615.35	0.00	1.00	0.09
NOVEMBER	-3.04	4,676.46	0.00	1.00	0.08
DECEMBER	2.42	3,020.36	0.00	1.00	0.06
Adjusted R-squared	0.64				

Table 17: SDG&E Multi-Family Whole House Model (Gas)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	-0.64	0.06	-10.41	0.00	0.40
HDD	0.01	0.00	27.82	0.00	149.44
POST*HDD	0.00	0.00	3.93	0.00	56.01
FEBRUARY	-0.66	0.09	-7.08	0.00	0.07
MARCH	-2.02	0.09	-21.95	0.00	0.09
APRIL	-2.67	0.12	-23.22	0.00	0.08
MAY	-3.00	0.13	-23.78	0.00	0.10
JUNE	-3.60	0.15	-23.64	0.00	0.09
JULY	-4.04	0.16	-25.52	0.00	0.08
AUGUST	-4.36	0.16	-27.85	0.00	0.09
SEPTEMBER	-4.14	0.15	-27.80	0.00	0.08
OCTOBER	-3.04	0.12	-26.09	0.00	0.09
NOVEMBER	-1.03	0.09	-11.37	0.00	0.08
DECEMBER	0.62	0.09	6.52	0.00	0.07
Adjusted R-squared	0.72				

Table 18: SDG&E Mobile Home Whole House Model (Gas)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	-2.34	0.44	-5.36	0.00	0.46
HDD	0.05	0.00	15.64	0.00	145.26
POST*HDD	0.01	0.00	3.55	0.00	61.20
FEBRUARY	-2.45	0.72	-3.41	0.00	0.07
MARCH	-9.86	0.69	-14.32	0.00	0.09
APRIL	-13.21	0.82	-16.15	0.00	0.08
MAY	-16.89	0.91	-18.49	0.00	0.09
JUNE	-17.62	1.06	-16.55	0.00	0.09
JULY	-18.61	1.10	-16.85	0.00	0.09
AUGUST	-18.98	1.10	-17.29	0.00	0.09
SEPTEMBER	-17.42	1.10	-15.81	0.00	0.07
OCTOBER	-13.02	0.89	-14.66	0.00	0.10
NOVEMBER	-3.16	0.72	-4.37	0.00	0.07
DECEMBER	1.21	0.70	1.72	0.09	0.07
Adjusted R-squared	0.65				

Table 19: PG&E Single Family Whole House Model (Gas)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	0.46	0.04	11.97	0.00	0.49
HDD	0.07	0.00	381.30	0.00	230.55
POST*HDD	0.00	0.00	-36.41	0.00	105.10
FEBRUARY	-5.13	0.05	-96.14	0.00	0.08
MARCH	-12.35	0.06	-224.31	0.00	0.09
APRIL	-19.99	0.06	-313.68	0.00	0.08
MAY	-21.94	0.07	-316.19	0.00	0.08
JUNE	-22.69	0.08	-296.98	0.00	0.09
JULY	-23.11	0.08	-299.62	0.00	0.08
AUGUST	-22.83	0.08	-297.85	0.00	0.09
SEPTEMBER	-22.06	0.08	-293.21	0.00	0.08
OCTOBER	-17.10	0.06	-280.01	0.00	0.09
NOVEMBER	-2.53	0.05	-47.95	0.00	0.08
DECEMBER	9.31	0.05	169.58	0.00	0.07
Adjusted R-squared	0.72				

Table 20: PG&E Multi-Family Whole House Model (Gas)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	0.20	0.06	3.05	0.00	0.49
HDD	0.03	0.00	99.07	0.00	244.54
POST*HDD	0.00	0.00	-9.92	0.00	114.52
FEBRUARY	-1.60	0.08	-19.46	0.00	0.08
MARCH	-4.38	0.09	-50.63	0.00	0.09
APRIL	-7.27	0.10	-73.22	0.00	0.08
MAY	-8.18	0.11	-74.93	0.00	0.08
JUNE	-8.54	0.12	-69.87	0.00	0.08
JULY	-8.80	0.12	-70.95	0.00	0.08
AUGUST	-8.77	0.12	-71.05	0.00	0.09
SEPTEMBER	-8.39	0.12	-69.04	0.00	0.08
OCTOBER	-6.50	0.10	-66.62	0.00	0.09
NOVEMBER	-1.09	0.08	-13.06	0.00	0.08
DECEMBER	3.09	0.09	36.10	0.00	0.08
Adjusted R-squared	0.85				

Table 21: PG&E Mobile Home Whole House Model (Gas)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	1.61	1.50	1.07	0.28	0.48
HDD	0.09	0.01	16.55	0.00	234.90
POST*HDD	-0.01	0.00	-1.54	0.12	104.54
FEBRUARY	-5.14	1.78	-2.89	0.00	0.08
MARCH	-12.45	1.88	-6.64	0.00	0.09
APRIL	-24.69	2.21	-11.18	0.00	0.08
MAY	-31.94	2.35	-13.58	0.00	0.09
JUNE	-41.27	2.58	-16.01	0.00	0.09
JULY	-42.74	2.61	-16.35	0.00	0.08
AUGUST	-41.56	2.56	-16.23	0.00	0.09
SEPTEMBER	-35.37	2.49	-14.20	0.00	0.08
OCTOBER	-18.95	2.11	-9.00	0.00	0.09
NOVEMBER	-1.47	1.69	-0.87	0.39	0.08
DECEMBER	11.83	1.66	7.12	0.00	0.07
Adjusted R-squared	0.87				

Table 22: SCG Single Family Whole House Model

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	1.01	0.03	36.29	0.00	0.52
HDD	0.09	0.00	506.13	0.00	178.35
POST*HDD	-0.01	0.00	-82.23	0.00	84.93
FEBRUARY	-2.76	0.04	-64.65	0.00	0.08
MARCH	-6.68	0.04	-154.72	0.00	0.09
APRIL	-8.34	0.05	-168.17	0.00	0.09
MAY	-8.16	0.05	-149.14	0.00	0.09
JUNE	-6.61	0.06	-108.00	0.00	0.09
JULY	-6.77	0.06	-107.04	0.00	0.09
AUGUST	-6.85	0.06	-108.89	0.00	0.09
SEPTEMBER	-7.05	0.06	-114.72	0.00	0.07
OCTOBER	-7.18	0.05	-144.15	0.00	0.09
NOVEMBER	-1.06	0.04	-24.77	0.00	0.08
DECEMBER	2.01	0.05	43.28	0.00	0.06
Adjusted R-squared	0.67				

Table 23: SCG Multi-Family Whole House Model

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	0.54	0.04	13.11	0.00	0.50
HDD	0.03	0.00	107.98	0.00	164.97
POST*HDD	0.00	0.00	-24.68	0.00	75.86
FEBRUARY	-0.54	0.06	-9.37	0.00	0.08
MARCH	-1.76	0.06	-30.37	0.00	0.10
APRIL	-2.22	0.07	-32.37	0.00	0.09
MAY	-2.17	0.08	-28.18	0.00	0.09
JUNE	-1.55	0.09	-17.33	0.00	0.09
JULY	-1.63	0.09	-17.61	0.00	0.08
AUGUST	-1.67	0.09	-18.00	0.00	0.09
SEPTEMBER	-1.78	0.09	-19.89	0.00	0.07
OCTOBER	-1.72	0.07	-24.07	0.00	0.09
NOVEMBER	0.15	0.06	2.69	0.01	0.08
DECEMBER	1.02	0.06	16.51	0.00	0.06
Adjusted R-squared	0.71				

Table 24: SCG Mobile Home Whole House Model

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
POST	-0.16	0.16	-0.99	0.32	0.52
HDD	0.09	0.00	90.77	0.00	202.61
POST*HDD	-0.01	0.00	-8.41	0.00	97.72
FEBRUARY	-3.95	0.25	-15.77	0.00	0.08
MARCH	-10.32	0.26	-39.74	0.00	0.09
APRIL	-13.65	0.30	-44.88	0.00	0.09
MAY	-14.79	0.34	-43.82	0.00	0.09
JUNE	-13.36	0.38	-35.22	0.00	0.09
JULY	-12.69	0.40	-32.11	0.00	0.09
AUGUST	-12.59	0.39	-31.96	0.00	0.09
SEPTEMBER	-13.40	0.38	-35.45	0.00	0.07
OCTOBER	-11.98	0.30	-40.37	0.00	0.09
NOVEMBER	-3.47	0.25	-13.72	0.00	0.08
DECEMBER	1.81	0.27	6.64	0.00	0.06
Adjusted R-squared	0.71				

Table 25: SDG&E Microwave Measure Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
HDD	0.32	0.01	37.65	0.00	178.54
CDD	0.76	0.02	38.57	0.00	72.66
RoomAC	0.99	9.25	0.11	0.92	0.01
DuctTestSeal	14.32	6.38	2.25	0.02	0.03
ClothesWasher	-5.83	4.49	-1.30	0.19	0.04
HardwiredLighting	-9.74	2.38	-4.10	0.00	0.15
Insulation	18.68	13.67	1.37	0.17	0.02
Lighting	-2.13	3.60	-0.59	0.55	0.47
Microwave	-5.54	4.78	-1.16	0.25	0.47
Refrigerator	-62.01	3.61	-17.18	0.00	0.04
HWConservation	-4.00	5.56	-0.72	0.47	0.46
WHRepairReplace	17.04	4.81	3.54	0.00	0.03
Weatherization	23.15	5.59	4.14	0.00	0.44
RoomAC*CDD	0.16	0.05	3.22	0.00	1.38
DuctTestSeal*HDD	-0.09	0.03	-3.34	0.00	5.83
Insulation*CDD	-0.06	0.07	-0.83	0.41	1.38
Insulation*HDD	0.02	0.05	0.37	0.71	2.77
Weatherization*CDD	-0.06	0.02	-2.88	0.00	37.25
Weatherization*HDD	-0.02	0.01	-1.58	0.11	74.85
Adjusted R-squared	0.82				

Table 26: SCE Room AC Measure Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
CDD	1.13	0.02	67.72	0.00	175.98
HDD	0.56	0.01	39.74	0.00	204.67
RoomAC	9.19	5.94	1.55	0.12	0.51
CFL	4.56	5.05	0.90	0.37	0.55
EvaporativeCooler	-2.40	6.01	-0.40	0.69	0.27
Lighting	11.64	15.29	0.76	0.45	0.02
PoolPump	76.90	26.06	2.95	0.00	0.02
Refrigerator	-71.96	5.58	-12.89	0.00	0.15
HWConservation	532.28	283.49	1.88	0.06	0.00
Weatherization	-1092.18	336.84	-3.24	0.00	0.00
RoomAC*CDD	-0.08	0.02	-4.96	0.00	99.17
EvaporativeCooler*CDD	0.04	0.02	2.15	0.03	51.91
PoolPump*CDD	0.27	0.07	3.91	0.00	3.21
Weatherization*HDD	1.73	0.48	3.56	0.00	1.03
Weatherization*CDD	0.31	0.49	0.64	0.52	0.95
Adjusted R-squared	0.73				

Table 27: SCE Central AC Measure Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
CDD	1.60	0.01	240.02	0.00	221.79
HDD	0.71	0.01	112.33	0.00	216.83
CentralAC	14.89	5.51	2.70	0.01	0.49
CFL	-4.87	2.19	-2.23	0.03	0.55
EvaporativeCooler	2.44	2.67	0.92	0.36	0.33
Lighting	9.75	5.83	1.67	0.09	0.04
PoolPump	-60.62	8.08	-7.51	0.00	0.04
Refrigerator	-76.40	3.83	-19.94	0.00	0.07
HWConservation	-37.36	91.14	-0.41	0.68	0.00
Weatherization	163.10	108.88	1.50	0.13	0.00
DuctTestSeal	43.43	6.56	6.62	0.00	0.44
CentralAC*CDD	-0.13	0.01	-10.75	0.00	120.66
EvaporativeCooler*CDD	-0.14	0.01	-22.22	0.00	71.15
PoolPump*CDD	0.29	0.02	17.14	0.00	9.91
Weatherization*HDD	0.10	0.25	0.41	0.68	0.09
Weatherization*CDD	-0.48	0.23	-2.09	0.04	0.16
DuctTestSeal*HDD	-0.09	0.01	-9.02	0.00	89.32
DuctTestSeal*CDD	-0.06	0.01	-4.34	0.00	105.71
Adjusted R-squared	0.76				

Table 28: SCE Ducts Measure Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
CDD	1.60	0.01	219.27	0.00	217.62
HDD	0.72	0.01	104.93	0.00	220.18
CFL	-3.59	2.28	-1.57	0.12	0.55
EvaporativeCooler	3.51	2.75	1.28	0.20	0.34
Lighting	-0.45	6.02	-0.08	0.94	0.04
PoolPump	-53.83	7.99	-6.74	0.00	0.04
Refrigerator	-71.70	3.90	-18.38	0.00	0.08
HWConservation	-121.29	51.00	-2.38	0.02	0.01
Weatherization	95.76	56.65	1.69	0.09	0.01
DuctTestSeal	58.34	4.51	12.95	0.00	0.49
CentralHeatPump	-126.35	16.01	-7.89	0.00	0.01
EvaporativeCooler*CDD	-0.14	0.01	-21.89	0.00	71.46
PoolPump*CDD	0.27	0.02	15.27	0.00	9.53
Weatherization*HDD	0.52	0.12	4.22	0.00	0.94
Weatherization*CDD	-0.13	0.06	-2.07	0.04	2.17
DuctTestSeal*HDD	-0.10	0.01	-9.85	0.00	98.60
DuctTestSeal*CDD	-0.18	0.01	-17.44	0.00	118.79
CentralHeatPump*HDD	0.59	0.06	9.08	0.00	1.65
Adjusted R-squared	0.76				

Table 29: SCE Evaporative Cooler Measure Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
CDD	1.65	0.00	357.31	0.00	176.44
HDD	0.67	0.00	175.38	0.00	212.29
RoomAC	60.70	4.71	12.90	0.00	0.02
CentralAC	-2.75	8.23	-0.33	0.74	0.08
CFL	5.41	1.27	4.24	0.00	0.55
CentralHeatPump	4.95	30.30	0.16	0.87	0.00
DuctTestSeal	26.04	9.37	2.78	0.01	0.08
EvaporativeCooler	13.27	1.45	9.18	0.00	0.51
Lighting	11.00	4.23	2.60	0.01	0.02
PoolPump	-31.07	4.34	-7.16	0.00	0.03
Refrigerator	-65.84	1.83	-35.89	0.00	0.08
HWConservation	-58.55	36.49	-1.61	0.11	0.00
Weatherization	-176.89	47.69	-3.71	0.00	0.00
RoomAC*CDD	-0.18	0.01	-12.39	0.00	2.91
CentralAC*CDD	0.02	0.02	1.24	0.22	18.39
CentralHeatPump*HDD	0.32	0.09	3.78	0.00	0.12
DuctTestSeal*HDD	-0.03	0.01	-2.79	0.01	16.52
DuctTestSeal*CDD	-0.06	0.02	-2.81	0.01	17.12
EvaporativeCooler*CDD	-0.29	0.00	-72.31	0.00	99.98
PoolPump*CDD	0.32	0.01	25.71	0.00	5.62
Weatherization*HDD	0.96	0.09	11.27	0.00	0.57
Weatherization*CDD	-0.06	0.07	-0.87	0.38	0.72
Adjusted R-squared	0.72				

Table 30: SCE Lighting Measure Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
CDD	1.35	0.01	141.07	0.00	126.87
HDD	0.56	0.01	79.02	0.00	183.52
RoomAC	18.38	18.45	1.00	0.32	0.00
CentralAC	27.90	29.98	0.93	0.35	0.04
CFL	1.48	3.01	0.49	0.62	0.51
CentralHeatPump	39.76	106.12	0.38	0.71	0.00
DuctTestSeal	-134.20	33.51	-4.00	0.00	0.03
EvaporativeCooler	0.49	5.77	0.09	0.93	0.10
Lighting	-12.09	2.80	-4.33	0.00	0.54
PoolPump	14.72	11.18	1.32	0.19	0.01
Refrigerator	-65.40	2.82	-23.19	0.00	0.09
HWConservation	-38.04	24.37	-1.56	0.12	0.01
Weatherization	-18.54	31.21	-0.59	0.55	0.01
RoomAC*CDD	-0.05	0.06	-0.83	0.40	0.95
CentralAC*CDD	-0.17	0.06	-2.72	0.01	9.71
CentralHeatPump*HDD	-0.89	0.70	-1.27	0.20	0.03
DuctTestSeal*HDD	0.25	0.04	7.15	0.00	6.09
DuctTestSeal*CDD	0.36	0.07	5.25	0.00	8.83
EvaporativeCooler*CDD	-0.06	0.02	-3.31	0.00	20.85
PoolPump*CDD	0.24	0.03	7.10	0.00	2.89
Weatherization*HDD	0.41	0.08	4.84	0.00	1.25
Weatherization*CDD	-0.68	0.10	-6.53	0.00	1.02
Adjusted R-squared	0.75				

Table 31: SCG Hot Water Conservation Measure Model (Electric)

Variable Name	Coefficient Estimate	Standard Error	t statistic	P-value	Mean of Variable
HDD	0.10	0.00	1162.16	0.00	176.82
DuctTestSeal	-4.34	0.15	-28.39	0.00	0.01
FurnaceRepairReplace	2.24	0.06	38.23	0.00	0.06
FurnaceCleanTune	-4.12	0.06	-74.46	0.00	0.09
ClothesWasher	-2.73	0.11	-25.51	0.00	0.01
Insulation	-3.23	0.08	-38.33	0.00	0.04
HWConservation	-0.45	0.05	-8.82	0.00	0.51
WHRepairReplace	-0.29	0.19	-1.56	0.12	0.01
Weatherization	2.33	0.06	40.22	0.00	0.47
DuctTestSeal*HDD	0.02	0.00	28.66	0.00	1.80
FurnaceRepairReplace*HDD	0.01	0.00	30.10	0.00	9.38
FurnaceCleanTune*HDD	0.02	0.00	98.48	0.00	15.46
Insulation*HDD	0.01	0.00	18.85	0.00	5.85
Weatherization*HDD	-0.01	0.00	-111.42	0.00	77.40
Adjusted R-squared	0.67				

Appendix D: Detailed Impact Estimates

The following tables provide detailed measure impact estimates (kWh, kW, and therms) by utility, housing type, and (where possible) climate zone. The number of households and installed measures shown in these tables are based on an analysis of the utility-provided measure data after removing master metered customers and removing any ineligible measures per the California Statewide LIEE Policy and Procedures Manual dated August 2010.

Following the detailed impact results are additional tables showing the measure groupings used for each utility in the Basic and Measure regression models.

Table 32: SDG&E Detailed Impacts (kWh)

Measure Category	House Type	Number of Households	Number Installed	Savings per unit (kWh)	Savings per Household (kWh)	Total Program Savings (kWh)
Central AC	Single Family	11	11	38.66	38.66	425
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	19	19	0.00	0.00	0
Central AC Tune-Up	Single Family	58	58	231.56	231.56	13,431
	Multifamily	1	1	87.80	87.80	88
	Mobile Home	0	0	N/A	N/A	0
CFL	Single Family	8,334	60,376	16.62	120.40	1,003,449
	Multifamily	7,873	43,363	18.78	103.44	814,357
	Mobile Home	281	2,062	14.86	109.04	30,641
Duct Test Seal	Single Family	933	933	55.72	55.72	51,987
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	4	4	55.72	55.72	223
High Efficiency Clothes Washer	Single Family	1,575	1,577	122.90	123.05	193,811
	Multifamily	67	67	123.05	123.05	8,245
	Mobile Home	26	26	123.05	123.05	3,199
HWD Lights	Single Family	4,942	14,259	41.99	121.17	598,798
	Multifamily	1,569	3,156	53.56	107.73	169,035
	Mobile Home	130	332	31.89	81.44	10,587
Insulation - Heating	Single Family	789	789	0.00	0.00	0
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	0	0	N/A	N/A	0
Insulation - Cooling	Single Family	789	789	97.20	97.20	76,691
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	0	0	N/A	N/A	0
Lighting - LED Night Lights	Single Family	9,456	25,569	1.09	2.93	27,749
	Multifamily	10,697	27,918	1.12	2.93	31,391
	Mobile Home	299	466	1.88	2.93	877
Lighting - Torchiere	Single Family	3,263	5,185	21.43	34.06	111,133
	Multifamily	3,317	4,519	25.00	34.06	112,972
	Mobile Home	32	42	25.95	34.06	1,090
Microwaves	Single Family	466	467	66.37	66.52	30,996
	Multifamily	1,056	1,056	66.52	66.52	70,241
	Mobile Home	2	2	66.52	66.52	133
Refrigerator	Single Family	1,325	1,385	612.67	640.42	848,554
	Multifamily	442	451	627.64	640.42	283,065
	Mobile Home	43	44	625.86	640.42	27,538
Room AC	Single Family	96	116	25.68	31.03	2,979
	Multifamily	209	216	24.74	25.57	5,344
	Mobile Home	0	0	N/A	N/A	0
HWCons - Faucet Aerator	Single Family	443	925	2.20	4.59	2,032
	Multifamily	822	1,564	1.38	2.63	2,160
	Mobile Home	6	9	0.79	1.18	7
HWCons - Low Flow Showerhead	Single Family	442	636	3.97	5.72	2,527
	Multifamily	0	0	N/A	N/A	N/A
	Mobile Home	7	10	1.42	2.03	14
HWCons - Thermostatic Shower Valve	Single Family	158	221	64.98	90.89	14,360
	Multifamily	114	140	40.85	50.17	5,719
	Mobile Home	0	0	N/A	N/A	N/A
HWCons - Water Heater Blanket	Single Family	30	30	3.90	3.90	117
	Multifamily	22	23	2.45	2.57	56
	Mobile Home	0	0	N/A	N/A	N/A
HWCons - Water Heater Pipe Insulation	Single Family	87	87	0.39	0.39	34
	Multifamily	0	0	N/A	N/A	N/A
	Mobile Home	0	0	N/A	N/A	N/A
Water Heater Repair / Replace	Single Family	4	4	0.00	0.00	0
	Multifamily	1	1	0.00	0.00	0
	Mobile Home	1	1	0.00	0.00	0
Weatherization	Single Family	7,717	7,717	49.72	49.72	383,703
	Multifamily	8,787	8,787	49.35	49.35	433,672
	Mobile Home	252	252	51.99	51.99	13,100

Table 33: SDG&E Detailed Impacts (kW)

Measure Category	House Type	Number of Households	Number Installed	kWh to kW Converstion Factor	Savings per Unit (kW)	Savings per Household (kW)	Total Program Savings (kW)
Central AC	Single Family	11	11	0.00019	0.0075	0.0075	0.08
	Multifamily	0	0	0.00019	N/A	N/A	N/A
	Mobile Home	19	19	0.00019	0.0000	0.0000	0.00
Central AC Tune-Up	Single Family	58	58	0.00019	0.0449	0.0449	2.60
	Multifamily	1	1	0.00019	0.0170	0.0170	0.02
	Mobile Home	0	0	0.00019	N/A	N/A	N/A
CFL	Single Family	8,334	60,376	0.00012	0.0020	0.0146	121.98
	Multifamily	7,873	43,363	0.00012	0.0023	0.0126	98.99
	Mobile Home	281	2,062	0.00012	0.0018	0.0133	3.72
Duct Test Seal	Single Family	933	933	0.00021	0.0117	0.0117	10.96
	Multifamily	0	0	0.00021	N/A	N/A	N/A
	Mobile Home	4	4	0.00021	0.0117	0.0117	0.05
High Efficiency Clothes Washer	Single Family	1,575	1,577	0.00013	0.0158	0.0158	24.87
	Multifamily	67	67	0.00013	0.0158	0.0158	1.06
	Mobile Home	26	26	0.00013	0.0158	0.0158	0.41
HWD Lights	Single Family	4,942	14,259	0.00007	0.0029	0.0082	40.75
	Multifamily	1,569	3,156	0.00007	0.0036	0.0073	11.50
	Mobile Home	130	332	0.00007	0.0022	0.0055	0.72
Insulation - Heating	Single Family	789	789	0.00019	0.0000	0.0000	0.00
	Multifamily	0	0	0.00019	N/A	N/A	N/A
	Mobile Home	0	0	0.00019	N/A	N/A	N/A
Insulation - Cooling	Single Family	789	789	0.00019	0.0188	0.0188	14.87
	Multifamily	0	0	0.00019	N/A	N/A	N/A
	Mobile Home	0	0	0.00019	N/A	N/A	N/A
Lighting - LED Night Lights	Single Family	9,456	25,569	0.00012	0.0001	0.0004	3.46
	Multifamily	10,697	27,918	0.00012	0.0001	0.00	3.92
	Mobile Home	299	466	0.00012	0.0002	0.0004	0.11
Lighting - Torchiere	Single Family	3,263	5,185	0.00012	0.0027	0.0042	13.87
	Multifamily	3,317	4,519	0.00012	0.0031	0.0042	14.10
	Mobile Home	32	42	0.00012	0.0032	0.0042	0.14
Microwaves	Single Family	466	467	0.00020	0.0132	0.0132	6.17
	Multifamily	1,056	1,056	0.00020	0.0132	0.0132	13.98
	Mobile Home	2	2	0.00020	0.0132	0.0132	0.03
Refrigerator	Single Family	1,325	1,385	0.00012	0.0723	0.0756	100.15
	Multifamily	442	451	0.00012	0.0741	0.0756	33.41
	Mobile Home	43	44	0.00012	0.0739	0.0756	3.25
Room AC	Single Family	96	116	0.00019	0.0050	0.0060	0.58
	Multifamily	209	216	0.00019	0.0048	0.0050	1.04
	Mobile Home	0	0	0.00019	N/A	N/A	N/A
HWCons - Faucet Aerator	Single Family	443	925	0.00012	0.0003	0.0005	0.24
	Multifamily	822	1,564	0.00012	0.0002	0.0003	0.26
	Mobile Home	6	9	0.00012	0.0001	0.0001	0.00
HWCons - Low Flow Showerhead	Single Family	442	636	0.00012	0.0005	0.0007	0.30
	Multifamily	0	0	0.00012	N/A	N/A	N/A
	Mobile Home	7	10	0.00012	0.0002	0.0002	0.00
HWCons - Thermostatic Shower Valve	Single Family	158	221	0.00012	0.0077	0.0107	1.70
	Multifamily	114	140	0.00012	0.0048	0.0059	0.68
	Mobile Home	0	0	0.00012	N/A	N/A	N/A
HWCons - Water Heater Blanket	Single Family	30	30	0.00012	0.0005	0.0005	0.01
	Multifamily	22	23	0.00012	0.0003	0.0003	0.01
	Mobile Home	0	0	0.00012	N/A	N/A	N/A
HWCons - Water Heater Pipe Insulation	Single Family	87	87	0.00012	0.0000	0.0000	0.00
	Multifamily	0	0	0.00012	N/A	N/A	N/A
	Mobile Home	0	0	0.00012	N/A	N/A	N/A
Water Heater Repair / Replace	Single Family	4	4	0.00012	0.0000	0.0000	0.00
	Multifamily	1	1	0.00012	0.0000	0.0000	0.00
	Mobile Home	1	1	0.00012	0.0000	0.0000	0.00
Weatherization	Single Family	7,717	7,717	0.00021	0.0105	0.0105	80.86
	Multifamily	8,787	8,787	0.00021	0.0104	0.0104	91.39
	Mobile Home	252	252	0.00021	0.0110	0.0110	2.76

Table 34: PG&E Detailed Impacts (kWh)

Measure Category	House Type	Number of Households	Number Installed	Savings per unit (kWh)	Savings per Household (kWh)	Total Program Savings (kWh)
Room AC	Single Family	2,597	2,598	124.09	124.13	322,376
	Multifamily	436	436	25.27	25.27	11,020
	Mobile Home	169	171	134.52	136.11	23,003
Central AC	Single Family	78	78	145.14	145.14	11,321
	Multifamily	0	0	N/A	N/A	N/A
	Mobile Home	1	1	-138.96	-138.96	-139
Central AC Tune-Up	Single Family	10,639	10,909	231.57	237.45	2,526,192
	Multifamily	1,081	1,116	157.59	162.69	175,867
	Mobile Home	403	407	212.92	215.03	86,659
CFL	Single Family	76,590	364,012	16.00	76.04	5,824,192
	Multifamily	18,765	84,467	16.00	72.02	1,351,472
	Mobile Home	4,047	19,290	16.00	76.26	308,640
Duct Test Seal	Single Family	2,980	2,980	112.43	112.43	335,043
	Multifamily	0	0	N/A	N/A	N/A
	Mobile Home	27	27	94.58	94.58	2,554
Evaporative Cooler	Single Family	5,525	5,527	260.61	260.71	1,440,406
	Multifamily	0	0	N/A	N/A	N/A
	Mobile Home	316	316	287.37	287.37	90,808
HWD Lights	Single Family	69,182	211,442	48.33	147.70	10,217,935
	Multifamily	14,260	33,453	57.00	133.71	1,906,697
	Mobile Home	3,834	10,436	57.00	155.15	594,852
Insulation - Heating	Single Family	6,105	6,116	40.33	40.40	246,653
	Multifamily	185	187	39.97	40.40	7,474
	Mobile Home	0	0	N/A	N/A	N/A
Insulation - Cooling	Single Family	6,105	6,116	105.75	105.94	646,767
	Multifamily	185	187	104.81	105.94	19,599
	Mobile Home	0	0	N/A	N/A	N/A
Lighting*	Single Family	24,199	32,498	111.26	149.42	3,615,815
	Multifamily	1,996	2,125	39.90	42.48	84,788
	Mobile Home	219	247	39.90	45.00	9,855
Refrigerator	Single Family	13,298	13,298	655.36	655.36	8,714,930
	Multifamily	2,540	2,541	655.10	655.36	1,664,605
	Mobile Home	935	935	655.36	655.36	612,758
Weatherization - Heating	Single Family	51,047	281,212	30.13	165.98	8,472,571
	Multifamily	12,004	50,620	41.78	176.17	2,114,796
	Mobile Home	1,700	7,102	42.30	176.70	300,386
Weatherization - Cooling	Single Family	51,047	281,212	0.00	0.00	0
	Multifamily	12,004	50,620	0.00	0.00	0
	Mobile Home	1,700	7,102	0.00	0.00	0
HW Conservation	Single Family	4,519	13,190	123.34	360.00	1,626,840
	Multifamily	3,402	9,159	60.54	163.00	554,526
	Mobile Home	529	1,509	84.84	242.00	128,018

*Occupancy Sensor, Torchiere

Table 35: PG&E Detailed Impacts (kW)

Measure Category	House Type	Number of Households	Number Installed	kWh to kW Converstion Factor	Savings per Unit (kW)	Savings per Household (kW)	Total Program Savings (kW)
Room AC	Single Family	2,597	2,598	0.00018	0.0228	0.0228	59.24
	Multifamily	436	436	0.00018	0.0046	0.0046	2.02
	Mobile Home	169	171	0.00018	0.0247	0.0250	4.23
Central AC	Single Family	78	78	0.00018	0.0267	0.0267	2.08
	Multifamily	0	0	0.00018	N/A	N/A	N/A
	Mobile Home	1	1	0.00018	-0.0255	-0.0255	-0.03
Central AC Tune-Up	Single Family	10,639	10,909	0.00018	0.0426	0.0436	464.18
	Multifamily	1,081	1,116	0.00018	0.0290	0.0299	32.32
	Mobile Home	403	407	0.00018	0.0391	0.0395	15.92
CFL	Single Family	76,590	364,012	0.00013	0.0020	0.0097	742.50
	Multifamily	18,765	84,467	0.00013	0.0020	0.0092	172.29
	Mobile Home	4,047	19,290	0.00013	0.0020	0.0097	39.35
Duct Test Seal	Single Family	2,980	2,980	0.00016	0.0184	0.0184	54.78
	Multifamily	0	0	0.00016	N/A	N/A	N/A
	Mobile Home	27	27	0.00016	0.0155	0.0155	0.42
Evaporative Cooler	Single Family	5,525	5,527	0.00032	0.0845	0.0845	467.11
	Multifamily	0	0	0.00032	N/A	N/A	N/A
	Mobile Home	316	316	0.00032	0.0932	0.0932	29.45
HWD Lights	Single Family	69,182	211,442	0.00013	0.0062	0.0188	1,302.63
	Multifamily	14,260	33,453	0.00013	0.0073	0.0170	243.08
	Mobile Home	3,834	10,436	0.00013	0.0073	0.0198	75.83
Insulation - Heating	Single Family	6,105	6,116	0.00019	0.0078	0.0078	47.60
	Multifamily	185	187	0.00019	0.0077	0.0078	1.44
	Mobile Home	0	0	0.00019	N/A	N/A	N/A
Insulation - Cooling	Single Family	6,105	6,116	0.00019	0.0204	0.0204	124.83
	Multifamily	185	187	0.00019	0.0202	0.0204	3.78
	Mobile Home	0	0	0.00019	N/A	N/A	N/A
Lighting*	Single Family	24,199	32,498	0.00013	0.0142	0.0190	460.96
	Multifamily	1,996	2,125	0.00013	0.0051	0.0054	10.81
	Mobile Home	219	247	0.00013	0.0051	0.0057	1.26
Refrigerator	Single Family	13,298	13,298	0.00014	0.0891	0.0891	1,184.46
	Multifamily	2,540	2,541	0.00014	0.0890	0.0891	226.24
	Mobile Home	935	935	0.00014	0.0891	0.0891	83.28
Weatherization - Heating	Single Family	51,047	281,212	0.00019	0.0058	0.0320	1,635.21
	Multifamily	12,004	50,620	0.00019	0.0081	0.0340	408.16
	Mobile Home	1,700	7,102	0.00019	0.0082	0.0341	57.97
Weatherization - Cooling	Single Family	51,047	281,212	0.00019	0.0000	0.0000	0.00
	Multifamily	12,004	50,620	0.00019	0.0000	0.0000	0.00
	Mobile Home	1,700	7,102	0.00019	0.0000	0.0000	0.00
HW Conservation	Single Family	4,519	13,190	0.00015	0.0188	0.0548	247.43
	Multifamily	3,402	9,159	0.00015	0.0092	0.0248	84.34
	Mobile Home	529	1,509	0.00015	0.0129	0.0368	19.47

*Occupancy Sensor, Torchiere

Table 36: SCE Detailed Impacts (kWh)

Measure Category	House Type	Number of Households	Number Installed	Savings per unit (kWh)	Savings per Household (kWh)	Total Program Savings (kWh)
AC Tune-Up	Single Family	26	26	204.00	204.00	5,304
	Multi-Family	2	2	27.00	27.00	54
	Mobile Home	4	4	26.00	26.00	104
Central AC	Single Family	4,393	4,394	148.19	148.23	651,156
	Multi-Family	163	163	252.95	252.95	41,231
	Mobile Home	321	321	280.40	280.40	90,010
CFL	Single Family	56,079	242,221	16.50	71.25	3,995,629
	Multi-Family	8,823	36,196	17.37	71.25	628,639
	Mobile Home	3,151	14,337	15.66	71.25	224,509
Central Heat Pump	Single Family	87	87	666.55	666.55	57,990
	Multi-Family	43	43	692.78	692.78	29,790
	Mobile Home	7	7	1066.92	1066.92	7,468
Duct Test Seal	Single Family	4,226	4,226	13.47	13.47	56,920
	Multi-Family	184	184	115.07	115.07	21,173
	Mobile Home	89	89	160.54	160.54	14,288
Evaporative Cooler	Single Family	15,092	15,092	446.62	446.62	6,740,372
	Mobile Home	878	878	466.97	466.97	409,997
Evaporative Cooler Tune Up	Single Family	9	9	37.13	37.13	334
Lighting Fixture	Single Family	835	1,177	35.00	49.33	41,191
Torchiere	Single Family	1,703	1,903	85.70	95.76	163,079
	Multi-Family	786	786	95.76	95.76	75,267
	Mobile Home	93	93	95.76	95.76	8,906
Pool Pump	Single Family	1,912	1,912	1088.00	1088.00	2,080,256
Refrigerator	Single Family	12,317	12,317	773.99	773.99	9,533,295
	Multi-Family	3,715	3,715	773.99	773.99	2,875,391
	Mobile Home	726	726	773.99	773.99	561,920
Room AC	Single Family	788	788	55.91	55.91	44,060
	Multi-Family	67	67	58.26	58.26	3,903
	Mobile Home	76	76	63.08	63.08	4,794
Faucet Aerators	Single Family	221	454	84.00	172.56	38,136
	Multi-Family	161	273	84.00	142.43	22,932
	Mobile Home	15	39	84.00	218.40	3,276
Low-Flow Showerhead	Single Family	215	291	84.00	113.69	24,444
	Multi-Family	192	216	84.00	94.50	18,144
	Mobile Home	13	19	84.00	122.77	1,596
Water Heater Blanket	Single Family	48	50	84.00	87.50	4,200
	Multi-Family	8	8	84.00	84.00	672
	Mobile Home	7	7	84.00	84.00	588
Water Heater Pipe Wrap	Single Family	52	53	84.00	85.62	4,452
	Multi-Family	5	5	84.00	84.00	420
	Mobile Home	7	7	84.00	84.00	588
Weatherization	Single Family	312	1,088	23.83	83.10	25,927
	Multi-Family	198	746	2.89	10.89	2,156
	Mobile Home	21	36	33.05	56.66	1,190

Table 37: SCE Detailed Impacts (kW)

Measure Category	House Type	Number of Households	Number Installed	kWh to kW Conversion Factor	Savings per Unit (kW)	Savings per Household (kW)	Total Program Savings (kW)
AC Tune-Up	Single Family	26	26	0.00015	0.0315	0.0315	0.82
	Multi-Family	2	2	0.00015	0.0042	0.0042	0.01
	Mobile Home	4	4	0.00015	0.0040	0.0040	0.02
Central AC	Single Family	4,393	4,394	0.00015	0.0229	0.0229	100.47
	Multi-Family	163	163	0.00015	0.0390	0.0390	6.36
	Mobile Home	321	321	0.00015	0.0433	0.0433	13.89
CFL	Single Family	56,079	242,221	0.00013	0.0021	0.0091	512.03
	Multi-Family	8,823	36,196	0.00013	0.0022	0.0091	80.56
	Mobile Home	3,151	14,337	0.00013	0.0020	0.0091	28.77
Central Heat Pump	Single Family	87	87	0.00045	0.3031	0.3031	26.37
	Multi-Family	43	43	0.00045	0.3150	0.3150	13.54
	Mobile Home	7	7	0.00045	0.4851	0.4851	3.40
Duct Test Seal	Single Family	4,226	4,226	0.00016	0.0022	0.0022	9.15
	Multi-Family	184	184	0.00016	0.0185	0.0185	3.40
	Mobile Home	89	89	0.00016	0.0258	0.0258	2.30
Evaporative Cooler	Single Family	15,092	15,092	0.00015	0.0689	0.0689	1040.05
	Mobile Home	878	878	0.00015	0.0721	0.0721	63.26
Evaporative Cooler Tune Up	Single Family	9	9	0.00015	0.0057	0.0057	0.05
Lighting Fixture	Single Family	835	1,177	0.00013	0.0045	0.0063	5.28
Torchiere	Single Family	1,703	1,903	0.00013	0.0110	0.0123	20.90
	Multi-Family	786	786	0.00013	0.0123	0.0123	9.65
	Mobile Home	93	93	0.00013	0.0123	0.0123	1.14
Pool Pump	Single Family	1,912	1,912	0.00005	0.0544	0.0544	104.10
Refrigerator	Single Family	12,317	12,317	0.00012	0.0933	0.0933	1149.38
	Multi-Family	3,715	3,715	0.00012	0.0933	0.0933	346.67
	Mobile Home	726	726	0.00012	0.0933	0.0933	67.75
Room AC	Single Family	788	788	0.00015	0.0086	0.0086	6.80
	Multi-Family	67	67	0.00015	0.0090	0.0090	0.60
	Mobile Home	76	76	0.00015	0.0097	0.0097	0.74
Faucet Aerators	Single Family	221	454	0.00012	0.0099	0.0204	4.51
	Multi-Family	161	273	0.00012	0.0099	0.0168	2.71
	Mobile Home	15	39	0.00012	0.0099	0.0258	0.39
Low-Flow Showerhead	Single Family	215	291	0.00012	0.0099	0.0134	2.89
	Multi-Family	192	216	0.00012	0.0099	0.0112	2.14
	Mobile Home	13	19	0.00012	0.0099	0.0145	0.19
Water Heater Blanket	Single Family	48	50	0.00012	0.0099	0.0103	0.50
	Multi-Family	8	8	0.00012	0.0099	0.0099	0.08
	Mobile Home	7	7	0.00012	0.0099	0.0099	0.07
Water Heater Pipe Wrap	Single Family	52	53	0.00012	0.0099	0.0101	0.53
	Multi-Family	5	5	0.00012	0.0099	0.0099	0.05
	Mobile Home	7	7	0.00012	0.0099	0.0099	0.07
Weatherization	Single Family	312	1,088	0.00012	0.0029	0.0100	3.13
	Multi-Family	198	746	0.00012	0.0003	0.0013	0.26
	Mobile Home	21	36	0.00012	0.0040	0.0068	0.14

Table 38: SDG&E Detailed Impacts (therms)

Measure Category	House Type	Number of Households	Number Installed	Savings per unit (therms)	Savings per Household (therms)	Total Program Savings (therms)
Duct Test Seal	Single Family	925	925	14.54	14.54	13,450
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	4	4	12.46	12.46	50
Furnace Clean & Tune	Single Family	4,985	5,271	9.17	9.69	48,327
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	239	240	10.66	10.70	2,558
Furnace Repair/Replace	Single Family	2,931	4,470	0.00	0.00	0
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	79	107	0.00	0.00	0
High Efficiency Clothes Washer	Single Family	1,513	1,515	15.86	15.88	24,023
	Multifamily	50	50	15.88	15.88	794
	Mobile Home	22	22	15.88	15.88	349
Insulation	Single Family	726	726	26.60	26.60	19,313
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	0	0	N/A	N/A	0
Pilot Light Conversion	Single Family	247	247	15.10	15.10	3,729
	Multifamily	32	32	15.10	15.10	483
	Mobile Home	31	31	15.10	15.10	468
HWCons - Faucet Aerator	Single Family	7,213	15,873	0.42	0.92	6,656
	Multifamily	2,978	6,212	0.15	0.31	925
	Mobile Home	179	338	0.20	0.37	66
HWCons - Low Flow Showerhead	Single Family	7,100	11,265	0.75	1.19	8,448
	Multifamily	2,864	3,987	0.27	0.37	1,062
	Mobile Home	180	257	0.35	0.50	90
HWCons - Thermostatic Shower Valve	Single Family	3,178	4,998	2.87	4.51	14,346
	Multifamily	633	946	1.02	1.52	964
	Mobile Home	5	6	1.34	1.61	8
HWCons - Water Heater Blanket	Single Family	736	740	0.49	0.49	364
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	51	51	0.23	0.23	12
HWCons - Water Heater Pipe Insulation	Single Family	402	404	0.05	0.05	21
	Multifamily	28	28	0.02	0.02	1
	Mobile Home	73	73	0.02	0.02	2
Water Heater Repair/Replace	Single Family	1,167	1,167	6.80	6.80	7,935
	Multifamily	52	52	6.80	6.80	354
	Mobile Home	17	17	6.80	6.80	116
Weatherization	Single Family	6,776	6,776	3.32	3.32	22,500
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	235	235	2.77	2.77	652

Table 39: PG&E Detailed Impacts (therms)

Measure Category	House Type	Number of Households	Number Installed	Savings per unit (therms)	Savings per Household (therms)	Total Program Savings (therms)
Duct Test Seal	Single Family	3,541	3,541	17.34	17.34	61,414.16
	Multifamily	0	0	N/A	N/A	N/A
	Mobile Home	37	37	4.55	4.55	168.22
Furnace Repair	Single Family	2,193	2,193	3.22	3.22	7,051.81
	Multifamily	1	1	-12.26	-12.26	-12.26
	Mobile Home	3	3	7.80	7.80	23.41
Furnace Replace	Single Family	1,218	1,218	3.31	3.31	4,030.00
	Multifamily	0	0	N/A	N/A	N/A
	Mobile Home	0	0	N/A	N/A	N/A
Insulation	Single Family	6,993	7,003	44.44	44.50	311,221.11
	Multifamily	172	174	43.74	44.25	7,611.17
	Mobile Home	0	0	N/A	N/A	N/A
Water Heater Repair/Replace	Single Family	1,292	1,316	5.47	5.58	7,204.93
	Multifamily	7	7	N/A	N/A	N/A
	Mobile Home	27	27	5.58	5.58	150.57
Weatherization	Single Family	58,690	321,201	1.87	10.22	599,971.35
	Multifamily	9,392	40,323	0.96	4.11	38,585.08
	Mobile Home	1,503	6,182	3.23	13.30	19,989.50
HW Conservation	Single Family	64,965	195,783	5.11	15.40	1,000,470.71
	Multifamily	13,006	35,941	2.53	7.00	91,042.15
	Mobile Home	1,691	4,706	3.74	10.40	17,586.32

Table 40: SCG Detailed Impacts (therms)

Measure Category	House Type	Number of Households	Number Installed	Savings per unit (therms)	Savings per Household (therms)	Total Program Savings (therms)
Clothes Washer	Single Family	4,533	4,533	30.88	30.88	139,991
	Multifamily	25	25	30.88	30.88	772
	Mobile Home	122	122	30.88	30.88	3,768
Duct Test Seal	Single Family	2,605	2,605	15.42	15.42	40,158
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	11	11	5.47	5.47	60
Furnace Clean & Tune	Single Family	19,767	20,379	5.55	5.72	113,025
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	432	432	2.66	2.66	1,149
Furnace Repair/Replace	Single Family	15,455	51,906	0.00	0.00	0
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	221	464	0.00	0.00	0
Insulation	Single Family	8,017	8,017	26.50	26.50	212,451
	Multifamily	219	219	27.19	27.19	5,955
	Mobile Home	0	0	N/A	N/A	0
Pilot Light Conversion	Single Family	97	103	42.00	44.60	4,326
	Multifamily	2	2	42.00	42.00	84
	Mobile Home	10	10	42.00	42.00	420
Water Heater Repair/Replace	Single Family	1,752	1,752	3.52	3.52	6,166
	Multifamily	0	0	N/A	N/A	0
	Mobile Home	67	67	3.52	3.52	236
Weatherization	Single Family	92,345	92,345	4.15	4.15	383,585
	Multifamily	14,129	14,129	1.97	1.97	27,873
	Mobile Home	2,596	2,596	7.97	7.97	20,703
HW Conservation	Single Family	96,023	333,347	0.95	3.31	317,441
	Multifamily	15,518	46,951	1.09	3.31	51,301
	Mobile Home	2,598	9,084	0.95	3.31	8,589

Table 41: SDG&E Detailed Impacts by Climate Zone (kWh)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (kWh)	Savings per Household (kWh)	Total Program Savings (kWh)
Central AC	Single Family	10	11	11	38.66	38.66	425
	Multifamily	All	0	0	N/A	N/A	0
	Mobile Home	10	19	19	0.00	0.00	0
Central AC Tune-Up	Single Family	7	8	8	81.72	81.72	654
	Single Family	10	50	50	255.54	255.54	12,777
	Multifamily	7	1	1	87.80	87.80	88
	Mobile Home	All	0	0	N/A	N/A	0
CFL	Single Family	All	8,334	60,376	16.62	120.40	1,003,449
	Multifamily	All	7,873	43,363	18.78	103.44	814,357
	Mobile Home	All	281	2,062	14.86	109.04	30,641
Duct Test Seal	Single Family	7	419	419	55.72	55.72	23,347
	Single Family	10	514	514	55.72	55.72	28,640
	Multifamily	All	0	0	N/A	N/A	0
	Mobile Home	10	4	4	55.72	55.72	223
High Efficiency Clothes Washer	Single Family	All	1,575	1,577	122.90	123.05	193,811
	Multifamily	All	67	67	123.05	123.05	8,245
	Mobile Home	All	26	26	123.05	123.05	3,199
HWD Lights	Single Family	All	4,942	14,259	41.99	121.17	598,798
	Multifamily	All	1,569	3,156	53.56	107.73	169,035
	Mobile Home	All	130	332	31.89	81.44	10,587
Insulation - Heating	Single Family	7	359	359	0.00	0.00	0
	Single Family	10	429	429	0.00	0.00	0
	Single Family	15	1	1	0.00	0.00	0
	Multifamily	All	0	0	N/A	N/A	0
	Mobile Home	All	0	0	N/A	N/A	0
Insulation - Cooling	Single Family	7	359	359	100.76	100.76	36,173
	Single Family	10	429	429	94.72	94.72	40,636
	Single Family	15	1	1	55.83	55.83	56
	Multifamily	All	0	0	N/A	N/A	0
	Mobile Home	All	0	0	N/A	N/A	0
Lighting - LED Night Lights	Single Family	All	9,456	25,569	1.09	2.93	27,749
	Multifamily	All	10,697	27,918	1.12	2.93	31,391
	Mobile Home	All	299	466	1.88	2.93	877
Lighting - Torchiere	Single Family	All	3,263	5,185	21.43	34.06	111,133
	Multifamily	All	3,317	4,519	25.00	34.06	112,972
	Mobile Home	All	32	42	25.95	34.06	1,090

Table 42: SDG&E Detailed Impacts by Climate Zone (kWh) (cont'd)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (kWh)	Savings per Household (kWh)	Total Program Savings (kWh)
Microwaves	Single Family	All	466	467	66.37	66.52	30,996
	Multifamily	All	1,056	1,056	66.52	66.52	70,241
	Mobile Home	All	2	2	66.52	66.52	133
Refrigerator	Single Family	All	1,325	1,385	612.67	640.42	848,554
	Multifamily	All	442	451	627.64	640.42	283,065
	Mobile Home	All	43	44	625.86	640.42	27,538
Room AC	Single Family	10	96	116	25.68	31.03	2,979
	Multifamily	10	209	216	24.74	25.57	5,344
	Mobile Home	All	0	0	N/A	N/A	0
HWCons - Faucet Aerator	Single Family	All	443	925	2.20	4.59	2,032
	Multifamily	All	822	1,564	1.38	2.63	2,160
	Mobile Home	All	6	9	0.79	1.18	7
HWCons - Low Flow Showerhead	Single Family	All	442	636	3.97	5.72	2,527
	Multifamily	All	0	0	N/A	N/A	N/A
	Mobile Home	All	7	10	1.42	2.03	14
HWCons - Thermostatic Shower Valve	Single Family	All	158	221	64.98	90.89	14,360
	Multifamily	All	114	140	40.85	50.17	5,719
	Mobile Home	All	0	0	N/A	N/A	N/A
HWCons - Water Heater Blanket	Single Family	All	30	30	3.90	3.90	117
	Multifamily	All	22	23	2.45	2.57	56
	Mobile Home	All	0	0	N/A	N/A	N/A
HWCons - Water Heater Pipe Insulation	Single Family	All	87	87	0.39	0.39	34
	Multifamily	All	0	0	N/A	N/A	N/A
	Mobile Home	All	0	0	N/A	N/A	N/A
Water Heater Repair/Replace	Single Family	All	4	4	0.00	0.00	0
	Multifamily	All	1	1	0.00	0.00	0
	Mobile Home	All	1	1	0.00	0.00	0
Weatherization	Single Family	7	3,617	3,617	45.22	45.22	163,561
	Single Family	10	4,073	4,073	53.75	53.75	218,924
	Single Family	14	17	17	50.45	50.45	858
	Single Family	15	10	10	43.02	43.02	430
	Multifamily	7	4,484	4,484	45.22	45.22	202,766
	Multifamily	10	4,303	4,303	53.75	53.75	231,286
	Mobile Home	7	48	48	45.22	45.22	2,171
	Mobile Home	10	202	202	53.75	53.75	10,858
	Mobile Home	15	2	2	43.02	43.02	86

Table 43: SDG&E Detailed Impacts by Climate Zone (kW)

Measure Category	House Type	Climate Zone	kWh to kW Converstion Factor	Savings per Unit (kW)	Savings per Household (kW)	Total Program Savings (kW)
Central AC	Single Family	10	0.00019	0.0075	0.0075	0.08
	Multifamily	All	0.00019	N/A	N/A	N/A
	Mobile Home	10	0.00019	0.0000	0.0000	0.00
Central AC Tune-Up	Single Family	7	0.00019	0.0158	0.0158	0.13
	Single Family	10	0.00019	0.0496	0.0496	2.48
	Multifamily	7	0.00019	0.0170	0.0170	0.02
	Mobile Home	All	0.00019	N/A	N/A	N/A
CFL	Single Family	All	0.00012	0.0020	0.0146	121.98
	Multifamily	All	0.00012	0.0023	0.0126	98.99
	Mobile Home	All	0.00012	0.0018	0.0133	3.72
Duct Test Seal	Single Family	7	0.00021	0.0117	0.0117	4.92
	Single Family	10	0.00021	0.0117	0.0117	6.04
	Multifamily	All	0.00021	N/A	N/A	N/A
	Mobile Home	10	0.00021	0.0117	0.0117	0.05
High Efficiency Clothes Washer	Single Family	All	0.00013	0.0158	0.0158	24.87
	Multifamily	All	0.00013	0.0158	0.0158	1.06
	Mobile Home	All	0.00013	0.0158	0.0158	0.41
HWD Lights	Single Family	All	0.00007	0.0029	0.0082	40.75
	Multifamily	All	0.00007	0.0036	0.0073	11.50
	Mobile Home	All	0.00007	0.0022	0.0055	0.72
Insulation - Heating	Single Family	7	0.00019	0.0000	0.0000	0.00
	Single Family	10	0.00019	0.0000	0.0000	0.00
	Single Family	15	0.00019	0.0000	0.0000	0.00
	Multifamily	All	0.00019	N/A	N/A	N/A
	Mobile Home	All	0.00019	N/A	N/A	N/A
Insulation - Cooling	Single Family	7	0.00019	0.0195	0.0195	7.01
	Single Family	10	0.00019	0.0184	0.0184	7.88
	Single Family	15	0.00019	0.0108	0.0108	0.01
	Multifamily	All	0.00019	N/A	N/A	N/A
	Mobile Home	All	0.00019	N/A	N/A	N/A
Lighting - LED Night Lights	Single Family	All	0.00012	0.0001	0.0004	3.46
	Multifamily	All	0.00012	0.0001	0.0004	3.92
	Mobile Home	All	0.00012	0.0002	0.0004	0.11
Lighting - Torchiere	Single Family	All	0.00012	0.0027	0.0042	13.87
	Multifamily	All	0.00012	0.0031	0.0042	14.10
	Mobile Home	All	0.00012	0.0032	0.0042	0.14

Table 44: SDG&E Detailed Impacts by Climate Zone (kW) (cont'd)

Measure Category	House Type	Climate Zone	kWh to kW Converstion Factor	Savings per Unit (kW)	Savings per Household (kW)	Total Program Savings (kW)
Microwaves	Single Family	All	0.00020	0.0132	0.0132	6.17
	Multifamily	All	0.00020	0.0132	0.0132	13.98
	Mobile Home	All	0.00020	0.0132	0.0132	0.03
Refrigerator	Single Family	All	0.00012	0.0723	0.0756	100.15
	Multifamily	All	0.00012	0.0741	0.0756	33.41
	Mobile Home	All	0.00012	0.0739	0.0756	3.25
Room AC	Single Family	10	0.00019	0.0050	0.0060	0.58
	Multifamily	10	0.00019	0.0048	0.0050	1.04
	Mobile Home	All	0.00019	N/A	N/A	N/A
HWCons - Faucet Aerator	Single Family	All	0.00012	0.0003	0.0005	0.24
	Multifamily	All	0.00012	0.0002	0.0003	0.26
	Mobile Home	All	0.00012	0.0001	0.0001	0.00
HWCons - Low Flow Showerhead	Single Family	All	0.00012	0.0005	0.0007	0.30
	Multifamily	All	0.00012	N/A	N/A	N/A
	Mobile Home	All	0.00012	0.0002	0.0002	0.00
HWCons - Thermostatic Shower Valve	Single Family	All	0.00012	0.0077	0.0107	1.70
	Multifamily	All	0.00012	0.0048	0.0059	0.68
	Mobile Home	All	0.00012	N/A	N/A	N/A
HWCons - Water Heater Blanket	Single Family	All	0.00012	0.0005	0.0005	0.01
	Multifamily	All	0.00012	0.0003	0.0003	0.01
	Mobile Home	All	0.00012	N/A	N/A	N/A
HWCons - Water Heater Pipe Insulation	Single Family	All	0.00012	0.0000	0.0000	0.00
	Multifamily	All	0.00012	N/A	N/A	N/A
	Mobile Home	All	0.00012	N/A	N/A	N/A
Water Heater Repair/Replace	Single Family	All	0.00012	0.0000	0.0000	0.00
	Multifamily	All	0.00012	0.0000	0.0000	0.00
	Mobile Home	All	0.00012	0.0000	0.0000	0.00
Weatherization	Single Family	7	0.00021	0.0095	0.0095	34.47
	Single Family	10	0.00021	0.0113	0.0113	46.14
	Single Family	14	0.00021	0.0106	0.0106	0.18
	Single Family	15	0.00021	0.0091	0.0091	0.09
	Multifamily	7	0.00021	0.0095	0.0095	42.73
	Multifamily	10	0.00021	0.0113	0.0113	48.74
	Mobile Home	7	0.00021	0.0095	0.0095	0.46
	Mobile Home	10	0.00021	0.0113	0.0113	2.29
	Mobile Home	15	0.00021	0.0091	0.0091	0.02

Table 45: PG&E Detailed Impacts by Climate Zone (kWh)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (kWh)	Savings per Household (kWh)	Total Program Savings (kWh)
Room AC	Single Family	3	2	2	14.09	14.09	28
	Single Family	11	313	313	98.47	98.47	30,821
	Single Family	12	1,461	1,466	86.77	87.07	127,205
	Single Family	13	793	794	202.92	203.18	161,118
	Single Family	16	12	12	153.23	153.23	1,839
	Multifamily	11	41	41	31.96	31.96	1,310
	Multifamily	12	343	343	20.17	20.17	6,918
	Multifamily	13	46	46	57.38	57.38	2,639
	Mobile Home	11	29	29	93.03	93.03	2,698
	Mobile Home	12	47	47	84.99	84.99	3,995
	Mobile Home	13	88	90	173.76	177.71	15,638
Central AC	Single Family	11-13	78	78	145.14	145.14	11,321
	Mobile Home	12	1	1	-138.96	-138.96	-139
Central AC Tune-Up	Single Family	2	68	76	67.01	74.89	5,093
	Single Family	3	68	71	23.83	24.88	1,692
	Single Family	4	354	368	104.27	108.39	38,371
	Single Family	11	1,479	1,521	275.38	283.20	418,853
	Single Family	12	6,025	6,179	196.70	201.73	1,215,409
	Single Family	13	2,638	2,687	314.79	320.64	845,841
	Single Family	16	7	7	133.22	133.22	933
	Multifamily	3	3	3	11.45	11.45	34
	Multifamily	4	25	25	57.20	57.20	1,430
	Multifamily	11	217	218	185.37	186.22	40,411
	Multifamily	12	477	507	105.40	112.03	53,438
	Multifamily	13	358	362	222.31	224.79	80,476
	Multifamily	16	1	1	78.17	78.17	78
	Mobile Home	2	7	7	69.13	69.13	484
	Mobile Home	3	4	4	21.66	21.66	87
	Mobile Home	4	2	2	85.58	85.58	171
	Mobile Home	11	206	206	227.94	227.94	46,956
	Mobile Home	12	110	114	172.68	178.96	19,686
	Mobile Home	13	73	73	262.46	262.46	19,160
	Mobile Home	16	1	1	116.61	116.61	117
Duct Test Seal	Single Family	1	21	21	188.78	188.78	3,964
	Single Family	2	107	107	124.08	124.08	13,277
	Single Family	3	797	797	147.08	147.08	117,226
	Single Family	4	1,205	1,205	140.34	140.34	169,113
	Single Family	11	35	35	54.87	54.87	1,921
	Single Family	12	420	420	88.17	88.17	37,033
	Single Family	13	394	394	0.00	0.00	0
	Single Family	16	1	1	0.00	0.00	0
	Mobile Home	1	5	5	188.75	188.75	944
	Mobile Home	2	7	7	132.88	132.88	930
	Mobile Home	3	3	3	142.02	142.02	426
	Mobile Home	4	1	1	142.66	142.66	143
	Mobile Home	11	3	3	24.39	24.39	73
	Mobile Home	12	1	1	48.94	48.94	49
	Mobile Home	13	7	7	0.00	0.00	0

Table 46: PG&E Detailed Impacts by Climate Zone (kWh) (cont'd)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (kWh)	Savings per Household (kWh)	Total Program Savings (kWh)
Evaporative Cooler	Single Family	11	138	138	145.67	145.67	20,102
	Single Family	12	2,237	2,237	164.29	164.29	367,517
	Single Family	13	3,130	3,132	334.06	334.27	1,046,276
	Single Family	16	20	20	325.56	325.56	6,511
	Mobile Home	11	16	16	184.47	184.47	2,952
	Mobile Home	12	59	59	171.81	171.81	10,137
	Mobile Home	13	236	236	324.23	324.23	76,518
	Mobile Home	16	5	5	240.25	240.25	1,201
Insulation - Heating	Single Family	1	183	183	62.38	62.38	11,416
	Single Family	2	213	213	49.55	49.55	10,553
	Single Family	3	1,617	1,623	42.59	42.75	69,130
	Single Family	4	1,314	1,314	38.71	38.71	50,864
	Single Family	11	511	512	43.22	43.30	22,127
	Single Family	12	1,512	1,514	37.77	37.82	57,178
	Single Family	13	734	736	33.10	33.19	24,364
	Single Family	16	21	21	44.25	44.25	929
	Multifamily	2	18	18	44.25	44.25	797
	Multifamily	3	14	14	41.85	41.85	586
	Multifamily	4	133	135	37.91	38.48	5,118
	Multifamily	12	12	12	39.01	39.01	468
	Multifamily	13	8	8	34.68	34.68	277
Insulation - Cooling	Single Family	1	183	183	6.72	6.72	1,231
	Single Family	2	213	213	80.23	80.23	17,089
	Single Family	3	1,617	1,623	45.28	45.45	73,495
	Single Family	4	1,314	1,314	60.70	60.70	79,756
	Single Family	11	511	512	161.35	161.67	82,613
	Single Family	12	1,512	1,514	142.70	142.89	216,049
	Single Family	13	734	736	247.25	247.92	181,975
	Single Family	16	21	21	179.51	179.51	3,770
	Multifamily	2	18	18	179.51	179.51	3,231
	Multifamily	3	14	14	179.51	179.51	2,513
	Multifamily	4	133	135	61.99	62.92	8,369
	Multifamily	12	12	12	129.71	129.71	1,557
	Multifamily	13	8	8	275.61	275.61	2,205
Weatherization	Single Family	1	920	4,180	37.81	171.79	158,046
	Single Family	2	2,490	12,169	16.86	82.39	205,147
	Single Family	3	10,407	57,542	0.00	0.00	0
	Single Family	4	8,200	48,709	0.00	0.00	0
	Single Family	11	5,344	27,671	13.34	69.05	369,002
	Single Family	12	13,877	69,146	0.00	0.00	0
	Single Family	13	9,654	60,946	3.74	23.64	228,196
	Single Family	16	155	849	19.69	107.85	16,717
	Multifamily	1	187	780	41.40	172.70	32,296
	Multifamily	2	1,726	7,263	18.03	75.86	130,929
	Multifamily	4	2,786	12,932	0.00	0.00	0
	Multifamily	11	1,201	4,594	22.04	84.32	101,273
	Multifamily	12	3,643	14,175	2.80	10.88	39,629
	Multifamily	13	2,453	10,843	6.29	27.79	68,169
	Multifamily	16	8	33	41.75	172.22	1,378
	Mobile Home	1	46	173	46.62	175.33	8,065
	Mobile Home	2	122	474	32.80	127.42	15,545
	Mobile Home	3	172	693	3.17	12.78	2,198
	Mobile Home	4	108	415	0.00	0.00	0
	Mobile Home	11	644	2,737	12.08	51.34	33,065
	Mobile Home	12	297	1,155	0.00	0.00	0
	Mobile Home	13	289	1,369	4.59	21.73	6,281
	Mobile Home	16	22	86	21.18	82.78	1,821

Table 47: PG&E Detailed Impacts by Climate Zone (kW)

Measure Category	House Type	Climate Zone	kWh to kW Converstion Factor	Savings per Unit (kW)	Savings per Household (kW)	Total Program Savings (kW)
Room AC	Single Family	3	0.00018	0.0026	0.0026	0.01
	Single Family	11	0.00018	0.0181	0.0181	5.66
	Single Family	12	0.00018	0.0159	0.0160	23.37
	Single Family	13	0.00018	0.0373	0.0373	29.61
	Single Family	16	0.00018	0.0282	0.0282	0.34
	Multifamily	11	0.00018	0.0059	0.0059	0.24
	Multifamily	12	0.00018	0.0037	0.0037	1.27
	Multifamily	13	0.00018	0.0105	0.0105	0.48
	Mobile Home	11	0.00018	0.0171	0.0171	0.50
	Mobile Home	12	0.00018	0.0156	0.0156	0.73
	Mobile Home	13	0.00018	0.0313	0.0320	2.81
Central AC	Single Family	11-13	0.00018	0.0267	0.0267	2.08
	Mobile Home	12	0.00018	-0.0255	-0.0255	-0.03
Central AC Tune-Up	Single Family	2	0.00018	0.0123	0.0138	0.94
	Single Family	3	0.00018	0.0044	0.0046	0.31
	Single Family	4	0.00018	0.0192	0.0199	7.05
	Single Family	11	0.00018	0.0506	0.0520	76.96
	Single Family	12	0.00018	0.0361	0.0371	223.33
	Single Family	13	0.00018	0.0578	0.0589	155.42
	Single Family	16	0.00018	0.0245	0.0245	0.17
	Multifamily	3	0.00018	0.0021	0.0021	0.01
	Multifamily	4	0.00018	0.0105	0.0105	0.26
	Multifamily	11	0.00018	0.0341	0.0342	7.43
	Multifamily	12	0.00018	0.0194	0.0206	9.82
	Multifamily	13	0.00018	0.0408	0.0413	14.79
	Multifamily	16	0.00018	0.0144	0.0144	0.01
	Mobile Home	2	0.00018	0.0127	0.0127	0.09
	Mobile Home	3	0.00018	0.0040	0.0040	0.02
	Mobile Home	4	0.00018	0.0157	0.0157	0.03
	Mobile Home	11	0.00018	0.0419	0.0419	8.63
	Mobile Home	12	0.00018	0.0317	0.0329	3.62
	Mobile Home	13	0.00018	0.0482	0.0482	3.52
	Mobile Home	16	0.00018	0.0214	0.0214	0.02
Duct Test Seal	Single Family	1	0.00016	0.0309	0.0309	0.65
	Single Family	2	0.00016	0.0203	0.0203	2.17
	Single Family	3	0.00016	0.0240	0.0240	19.17
	Single Family	4	0.00016	0.0229	0.0229	27.65
	Single Family	11	0.00016	0.0090	0.0090	0.31
	Single Family	12	0.00016	0.0144	0.0144	6.05
	Single Family	13	0.00016	0.0000	0.0000	0.00
	Single Family	16	0.00016	0.0000	0.0000	0.00
	Mobile Home	1	0.00016	0.0309	0.0309	0.15
	Mobile Home	2	0.00016	0.0217	0.0217	0.15
	Mobile Home	3	0.00016	0.0232	0.0232	0.07
	Mobile Home	4	0.00016	0.0233	0.0233	0.02
	Mobile Home	11	0.00016	0.0040	0.0040	0.01
	Mobile Home	12	0.00016	0.0080	0.0080	0.01
	Mobile Home	13	0.00016	0.0000	0.0000	0.00

Table 48: PG&E Detailed Impacts by Climate Zone (kW) (cont'd)

Measure Category	House Type	Climate Zone	kWh to kW Converstion Factor	Savings per Unit (kW)	Savings per Household (kW)	Total Program Savings (kW)
Evaporative Cooler	Single Family	11	0.00032	0.0472	0.0472	6.52
	Single Family	12	0.00032	0.0533	0.0533	119.18
	Single Family	13	0.00032	0.1083	0.1084	339.30
	Single Family	16	0.00032	0.1056	0.1056	2.11
	Mobile Home	11	0.00032	0.0598	0.0598	0.96
	Mobile Home	12	0.00032	0.0557	0.0557	3.29
	Mobile Home	13	0.00032	0.1051	0.1051	24.81
	Mobile Home	16	0.00032	0.0779	0.0779	0.39
Insulation - Heating	Single Family	1	0.00019	0.0353	0.0353	0.04
	Single Family	2	0.00019	0.0411	0.0411	0.08
	Single Family	3	0.00019	0.3121	0.3132	0.94
	Single Family	4	0.00019	0.2536	0.2536	1.01
	Single Family	11	0.00019	0.0986	0.0988	1.08
	Single Family	12	0.00019	0.2918	0.2922	3.50
	Single Family	13	0.00019	0.1417	0.1420	1.84
	Single Family	16	0.00019	0.0041	0.0041	0.06
	Multifamily	2	0.00019	0.0035	0.0035	0.01
	Multifamily	3	0.00019	0.0027	0.0027	0.01
	Multifamily	4	0.00019	0.0257	0.0261	0.10
	Multifamily	12	0.00019	0.0023	0.0023	0.03
	Multifamily	13	0.00019	0.0015	0.0015	0.02
Insulation - Cooling	Single Family	1	0.00019	0.0353	0.0353	0.04
	Single Family	2	0.00019	0.0411	0.0411	0.08
	Single Family	3	0.00019	0.3121	0.3132	0.94
	Single Family	4	0.00019	0.2536	0.2536	1.01
	Single Family	11	0.00019	0.0986	0.0988	1.08
	Single Family	12	0.00019	0.2918	0.2922	3.50
	Single Family	13	0.00019	0.1417	0.1420	1.84
	Single Family	16	0.00019	0.0041	0.0041	0.06
	Multifamily	2	0.00019	0.0035	0.0035	0.01
	Multifamily	3	0.00019	0.0027	0.0027	0.01
	Multifamily	4	0.00019	0.0257	0.0261	0.10
	Multifamily	12	0.00019	0.0023	0.0023	0.03
	Multifamily	13	0.00019	0.0015	0.0015	0.02
Weatherization	Single Family	1	0.00019	0.0073	0.0332	30.50
	Single Family	2	0.00019	0.0033	0.0159	39.59
	Single Family	3	0.00019	0.0000	0.0000	0.00
	Single Family	4	0.00019	0.0000	0.0000	0.00
	Single Family	11	0.00019	0.0026	0.0133	71.22
	Single Family	12	0.00019	0.0000	0.0000	0.00
	Single Family	13	0.00019	0.0007	0.0046	44.04
	Single Family	16	0.00019	0.0038	0.0208	3.23
	Multifamily	1	0.00019	0.0080	0.0333	6.23
	Multifamily	2	0.00019	0.0035	0.0146	25.27
	Multifamily	4	0.00019	0.0000	0.0000	0.00
	Multifamily	11	0.00019	0.0043	0.0163	19.55
	Multifamily	12	0.00019	0.0005	0.0021	7.65
	Multifamily	13	0.00019	0.0012	0.0054	13.16
	Multifamily	16	0.00019	0.0081	0.0332	0.27
	Mobile Home	1	0.00019	0.0090	0.0338	1.56
	Mobile Home	2	0.00019	0.0063	0.0246	3.00
	Mobile Home	3	0.00019	0.0006	0.0025	0.42
	Mobile Home	4	0.00019	0.0000	0.0000	0.00
	Mobile Home	11	0.00019	0.0023	0.0099	6.38
	Mobile Home	12	0.00019	0.0000	0.0000	0.00
	Mobile Home	13	0.00019	0.0009	0.0042	1.21
	Mobile Home	16	0.00019	0.0041	0.0160	0.35

Table 49: SCE Detailed Impacts by Climate Zone (kWh)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (kWh)	Savings per Household (kWh)	Total Program Savings (kWh)
AC Tune-Up	Single Family	13	2	2	204.00	204.00	408
	Single Family	14	15	15	204.00	204.00	3,060
	Single Family	15	9	9	204.00	204.00	1,836
	Multi-Family	15	2	2	27.00	27.00	54
	Mobile Home	15	4	4	26.00	26.00	104
Central AC	Single Family	14	3,673	3,673	100.68	100.68	369,802
	Single Family	15	720	721	397.92	398.47	286,897
	Multi-Family	14	81	81	97.02	97.02	7,859
	Multi-Family	15	82	82	397.39	397.39	32,586
	Mobile Home	14	128	128	108.66	108.66	13,908
	Mobile Home	15	193	193	397.39	397.39	76,696
CFL	Single Family	All	56,079	242,221	16.50	71.25	3,995,629
	Multi-Family	All	8,823	36,196	17.37	71.25	628,639
	Mobile Home	All	3,151	14,337	15.66	71.25	224,509
Central Heat Pump	Single Family	14	37	37	773.65	773.65	28,625.01
	Single Family	15	50	50	587.30	587.30	29,365.20
	Multi-Family	14	5	5	831.64	831.64	4,158.20
	Multi-Family	15	38	38	674.51	674.51	25,631.38
	Mobile Home	14	1	1	1,115.06	1,115.06	1,115.06
	Mobile Home	15	4	4	1,058.90	1,058.90	4,235.60
Duct Test Seal	Single Family	All	4,226	4,226	13.47	13.47	56,920
	Multi-Family	All	184	184	115.07	115.07	21,173
	Mobile Home	All	89	89	160.54	160.54	14,288
Evaporative Cooler	Single Family	10	8,028	8,028	399.37	399.37	3,206,181
	Single Family	13	1,991	1,991	452.23	452.23	900,384
	Single Family	14	4,641	4,641	469.61	469.61	2,179,447
	Single Family	15	412	412	1,140.12	1,140.12	469,730
	Single Family	16	20	20	69.91	69.91	1,398
	Mobile Home	10	557	557	387.16	387.16	215,649
	Mobile Home	13	110	110	451.79	451.79	49,696
	Mobile Home	14	144	144	487.57	487.57	70,210
	Mobile Home	15	64	64	1,137.69	1,137.69	72,812
	Mobile Home	16	3	3	274.19	274.19	823
Evaporative Cooler Tune-Up	Single Family	9	2	2	37.13	37.13	74
	Single Family	10	6	6	41.00	41.00	246
	Single Family	13	1	1	88.20	88.20	88
Lighting Fixture	Single Family	All	835	1,177	35.00	49.33	41,191
Torchiere	Single Family	All	1,703	1,903	85.70	95.76	163,079
	Multi-Family	All	786	786	95.76	95.76	75,267
	Mobile Home	All	93	93	95.76	95.76	8,906

Table 50: SCE Detailed Impacts by Climate Zone (kWh) (cont'd)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (kWh)	Savings per Household (kWh)	Total Program Savings (kWh)
Pool Pump	Single Family	All	1,912	1,912	1,088.00	1,088.00	2,080,256
Refrigerator	Single Family	All	12,317	12,317	773.99	773.99	9,533,295
	Multi-Family	All	3,715	3,715	773.99	773.99	2,875,391
	Mobile Home	All	726	726	773.99	773.99	561,920
Room AC	Single Family	10	410	410	44.35	44.35	18,183
	Single Family	13	278	278	58.98	58.98	16,395
	Single Family	14	85	85	63.79	63.79	5,422
	Single Family	15	15	15	249.37	249.37	3,741
	Multi-Family	10	30	30	43.29	43.29	1,299
	Multi-Family	13	1	1	58.37	58.37	58
	Multi-Family	14	35	35	61.50	61.50	2,153
	Multi-Family	15	1	1	248.70	248.70	249
	Mobile Home	10	35	35	40.97	40.97	1,434
	Mobile Home	13	29	29	58.85	58.85	1,707
	Mobile Home	14	8	8	68.76	68.76	550
	Mobile Home	15	4	4	248.70	248.70	995
Faucet Aerators	Single Family	All	221	454	84.00	172.56	38,136
	Multi-Family	All	161	273	84.00	142.43	22,932
	Mobile Home	All	15	39	84.00	218.40	3,276
Low-Flow Showerhead	Single Family	All	215	291	84.00	113.69	24,444
	Multi-Family	All	192	216	84.00	94.50	18,144
	Mobile Home	All	13	19	84.00	122.77	1,596
Water Heater Blanket	Single Family	All	48	50	84.00	87.50	4,200
	Multi-Family	All	8	8	84.00	84.00	672
	Mobile Home	All	7	7	84.00	84.00	588
Water Heater Pipe Wrap	Single Family	All	52	53	84.00	85.62	4,452
	Multi-Family	All	5	5	84.00	84.00	420
	Mobile Home	All	7	7	84.00	84.00	588
Weatherization	Single Family	8	37	142	2.02	7.76	287
	Single Family	9	74	354	21.60	103.31	7,645
	Single Family	10	66	175	11.23	29.77	1,965
	Single Family	13	23	49	30.89	65.82	1,514
	Single Family	14	74	270	7.43	27.12	2,007
	Single Family	15	37	92	143.75	357.43	13,225
	Single Family	16	1	6	0.20	1.18	1
	Multi-Family	8	160	663	2.24	9.27	1,483
	Multi-Family	10	31	66	7.42	15.79	490
	Multi-Family	13	4	8	26.18	52.35	209
	Multi-Family	14	3	9	18.48	55.45	166
	Mobile Home	10	4	7	31.02	54.29	217
	Mobile Home	13	3	4	73.62	98.16	294
	Mobile Home	14	10	20	24.55	49.10	491
	Mobile Home	15	3	4	40.50	54.00	162
	Mobile Home	16	1	1	34.00	34.00	34

Table 51: SCE Detailed Impacts by Climate Zone (kW)

Measure Category	House Type	Climate Zone	kWh to kW Converstion Factor	Savings per Unit (kW)	Savings per Household (kW)	Total Program Savings (kW)
AC Tune-Up	Single Family	13	0.00015	0.0315	0.0315	0.06
	Single Family	14	0.00015	0.0315	0.0315	0.47
	Single Family	15	0.00015	0.0315	0.0315	0.28
	Multi-Family	15	0.00015	0.0042	0.0042	0.01
	Mobile Home	15	0.00015	0.0040	0.0040	0.02
Central AC	Single Family	14	0.00015	0.0155	0.0155	57.06
	Single Family	15	0.00015	0.0614	0.0615	44.27
	Multi-Family	14	0.00015	0.0150	0.0150	1.21
	Multi-Family	15	0.00015	0.0613	0.0613	5.03
	Mobile Home	14	0.00015	0.0168	0.0168	2.15
	Mobile Home	15	0.00015	0.0613	0.0613	11.83
CFL	Single Family	All	0.00013	0.0021	0.0091	512.03
	Multi-Family	All	0.00013	0.0022	0.0091	80.56
	Mobile Home	All	0.00013	0.0020	0.0091	28.77
Central Heat Pump	Single Family	14	0.00045	0.3518	0.3518	13.02
	Single Family	15	0.00045	0.2670	0.2670	13.35
	Multi-Family	14	0.00045	0.3781	0.3781	1.89
	Multi-Family	15	0.00045	0.3067	0.3067	11.65
	Mobile Home	14	0.00045	0.5070	0.5070	0.51
	Mobile Home	15	0.00045	0.4815	0.4815	1.93
Duct Test Seal	Single Family	All	0.00016	0.0022	0.0022	9.15
	Multi-Family	All	0.00016	0.0185	0.0185	3.40
	Mobile Home	All	0.00016	0.0258	0.0258	2.30
Evaporative Cooler	Single Family	10	0.00015	0.0616	0.0616	494.72
	Single Family	13	0.00015	0.0698	0.0698	138.93
	Single Family	14	0.00015	0.0725	0.0725	336.29
	Single Family	15	0.00015	0.1759	0.1759	72.48
	Single Family	16	0.00015	0.0108	0.0108	0.22
	Mobile Home	10	0.00015	0.0597	0.0597	33.28
	Mobile Home	13	0.00015	0.0697	0.0697	7.67
	Mobile Home	14	0.00015	0.0752	0.0752	10.83
	Mobile Home	15	0.00015	0.1755	0.1755	11.24
	Mobile Home	16	0.00015	0.0423	0.0423	0.13
Evaporative Cooler Tune-Up	Single Family	9	0.00015	0.0057	0.0057	0.01
	Single Family	10	0.00015	0.0063	0.0063	0.04
	Single Family	13	0.00015	0.0136	0.0136	0.01
Lighting Fixture	Single Family	All	0.00013	0.0045	0.0063	5.28
Torchiere	Single Family	All	0.00013	0.0110	0.0123	20.90
	Multi-Family	All	0.00013	0.0123	0.0123	9.65
	Mobile Home	All	0.00013	0.0123	0.0123	1.14

Table 52: SCE Detailed Impacts by Climate Zone (kW) (cont'd)

Measure Category	House Type	Climate Zone	kWh to kW Converstion Factor	Savings per Unit (kW)	Savings per Household (kW)	Total Program Savings (kW)
Pool Pump	Single Family	All	0.00005	0.0544	0.0544	104.10
Refrigerator	Single Family	All	0.00012	0.0933	0.0933	1,149.38
	Multi-Family	All	0.00012	0.0933	0.0933	346.67
	Mobile Home	All	0.00012	0.0933	0.0933	67.75
Room AC	Single Family	10	0.00015	0.0068	0.0068	2.81
	Single Family	13	0.00015	0.0091	0.0091	2.53
	Single Family	14	0.00015	0.0098	0.0098	0.84
	Single Family	15	0.00015	0.0385	0.0385	0.58
	Multi-Family	10	0.00015	0.0067	0.0067	0.20
	Multi-Family	13	0.00015	0.0090	0.0090	0.01
	Multi-Family	14	0.00015	0.0095	0.0095	0.33
	Multi-Family	15	0.00015	0.0384	0.0384	0.04
	Mobile Home	10	0.00015	0.0063	0.0063	0.22
	Mobile Home	13	0.00015	0.0091	0.0091	0.26
	Mobile Home	14	0.00015	0.0106	0.0106	0.08
	Mobile Home	15	0.00015	0.0384	0.0384	0.15
Faucet Aerators	Single Family	All	0.00012	0.0099	0.0204	4.51
	Multi-Family	All	0.00012	0.0099	0.0168	2.71
	Mobile Home	All	0.00012	0.0099	0.0258	0.39
Low-Flow Showerhead	Single Family	All	0.00012	0.0099	0.0134	2.89
	Multi-Family	All	0.00012	0.0099	0.0112	2.14
	Mobile Home	All	0.00012	0.0099	0.0145	0.19
Water Heater Blanket	Single Family	All	0.00012	0.0099	0.0103	0.50
	Multi-Family	All	0.00012	0.0099	0.0099	0.08
	Mobile Home	All	0.00012	0.0099	0.0099	0.07
Water Heater Pipe Wrap	Single Family	All	0.00012	0.0099	0.0101	0.53
	Multi-Family	All	0.00012	0.0099	0.0099	0.05
	Mobile Home	All	0.00012	0.0099	0.0099	0.07
Weatherization	Single Family	8	0.00012	0.0002	0.0009	0.03
	Single Family	9	0.00012	0.0026	0.0125	0.92
	Single Family	10	0.00012	0.0014	0.0036	0.24
	Single Family	13	0.00012	0.0037	0.0079	0.18
	Single Family	14	0.00012	0.0009	0.0033	0.24
	Single Family	15	0.00012	0.0173	0.0431	1.59
	Single Family	16	0.00012	0.0000	0.0001	0.00
	Multi-Family	8	0.00012	0.0003	0.0011	0.18
	Multi-Family	10	0.00012	0.0009	0.0019	0.06
	Multi-Family	13	0.00012	0.0032	0.0063	0.03
	Multi-Family	14	0.00012	0.0022	0.0067	0.02
	Mobile Home	10	0.00012	0.0037	0.0065	0.03
	Mobile Home	13	0.00012	0.0089	0.0118	0.04
	Mobile Home	14	0.00012	0.0030	0.0059	0.06
	Mobile Home	15	0.00012	0.0049	0.0065	0.02
	Mobile Home	16	0.00012	0.0041	0.0041	0.00

Table 53: SDG&E Detailed Impacts by Climate Zone (therms)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (therms)	Savings per Household (therms)	Total Program Savings (therms)
Duct Test Seal	Single Family	7	416	416	17.19	17.19	7,152
	Single Family	10	509	509	12.36	12.36	6,291
	Mobile Home	10	4	4	12.46	12.46	50
Furnace Clean & Tune	Single Family	7	2,279	2,405	13.02	13.74	31,307
	Single Family	10	2,706	2,866	5.96	6.32	17,091
	Mobile Home	7	44	44	10.70	10.70	471
	Mobile Home	10	193	194	10.65	10.70	2,066
	Mobile Home	15	2	2	10.70	10.70	21
Furnace Repair/Replace	Single Family	7	1,407	2,161	0.00	0.00	0
	Single Family	10	1,524	2,309	0.00	0.00	0
	Mobile Home	7	11	12	0.00	0.00	0
	Mobile Home	10	68	95	0.00	0.00	0
High Efficiency Clothes Washer	Single Family	All	1,513	1,515	15.86	15.88	24,023
	Multifamily	All	50	50	15.88	15.88	794
	Mobile Home	All	22	22	15.88	15.88	349
Insulation	Single Family	7	342	342	28.82	28.82	9,858
	Single Family	10	384	384	24.72	24.72	9,492
Pilot Light Conversion	Single Family	All	247	247	15.10	15.10	3,729
	Multifamily	All	32	32	15.10	15.10	483
	Mobile Home	All	31	31	15.10	15.10	468
HWCons - Faucet Aerator	Single Family	All	7,213	15,873	0.42	0.92	6,656
	Multifamily	All	2,978	6,212	0.15	0.31	925
	Mobile Home	All	179	338	0.20	0.37	66
HWCons - Low Flow Showerhead	Single Family	All	7,100	11,265	0.75	1.19	8,448
	Multifamily	All	2,864	3,987	0.27	0.37	1,062
	Mobile Home	All	180	257	0.35	0.50	90
HWCons - Thermostatic Shower Valve	Single Family	All	3,178	4,998	2.87	4.51	14,346
	Multifamily	All	633	946	1.02	1.52	964
	Mobile Home	All	5	6	1.34	1.61	8
HWCons - Water Heater Blanket	Single Family	All	736	740	0.49	0.49	364
	Mobile Home	All	51	51	0.23	0.23	12
HWCons - Water Heater Pipe Insulation	Single Family	All	402	404	0.05	0.05	21
	Multifamily	All	28	28	0.02	0.02	1
	Mobile Home	All	73	73	0.02	0.02	2
Water Heater Repair/Replace	Single Family	All	1,167	1,167	6.80	6.80	7,935
	Multifamily	All	52	52	6.80	6.80	354
	Mobile Home	All	17	17	6.80	6.80	116
Weatherization	Single Family	7	3,169	3,169	0.63	0.63	1,998
	Single Family	10	3,607	3,607	5.67	5.67	20,454
	Mobile Home	7	44	44	2.77	2.77	122
	Mobile Home	10	189	189	2.77	2.77	524
	Mobile Home	15	2	2	2.77	2.77	6

Table 54: PG&E Detailed Impacts by Climate Zone (therms)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (therms)	Savings per Household (therms)	Total Program Savings (therms)
Duct Test Seal	Single Family	1	21	21	0.00	0.00	0.00
	Single Family	2	107	107	0.00	0.00	0.00
	Single Family	3	803	803	15.37	15.37	12,339.80
	Single Family	4	1252	1,252	18.76	18.76	23,486.33
	Single Family	11	33	33	7.18	7.18	237.09
	Single Family	12	938	938	15.98	15.98	14,985.62
	Single Family	13	387	387	30.99	30.99	11,993.18
	Mobile Home	1	5	5	0.00	0.00	0.00
	Mobile Home	2	7	7	0.00	0.00	0.00
	Mobile Home	3	1	1	20.95	20.95	20.95
	Mobile Home	4	1	1	18.86	18.86	18.86
	Mobile Home	11	3	3	17.57	17.57	52.72
	Mobile Home	12	14	14	15.55	15.55	217.65
	Mobile Home	13	6	6	27.63	27.63	165.79
Furnace Repair	Single Family	1	6	6	5.82	5.82	34.92
	Single Family	2	61	61	4.16	4.16	253.76
	Single Family	3	374	374	3.58	3.58	1,338.92
	Single Family	4	207	207	3.10	3.10	641.70
	Single Family	11	134	134	3.68	3.68	493.12
	Single Family	12	964	964	3.15	3.15	3,036.60
	Single Family	13	445	445	2.80	2.80	1,246.00
	Single Family	16	2	2	3.38	3.38	6.76
	Multifamily	13	1	1	0.00	0.00	0.00
	Mobile Home	1	1	1	10.62	10.62	10.62
	Mobile Home	3	1	1	7.60	7.60	7.60
	Mobile Home	13	1	1	5.19	5.19	5.19
Furnace Replace	Single Family	1	40	40	5.82	5.82	232.80
	Single Family	2	29	29	4.16	4.16	120.64
	Single Family	3	335	335	3.58	3.58	1,199.30
	Single Family	4	287	287	3.10	3.10	889.70
	Single Family	11	38	38	3.68	3.68	139.84
	Single Family	12	221	221	3.15	3.15	696.15
	Single Family	13	266	266	2.80	2.80	744.80
	Single Family	16	2	2	3.38	3.38	6.76
Insulation	Single Family	1	177	177	31.95	31.95	5,655.05
	Single Family	2	205	205	39.23	39.23	8,042.88
	Single Family	3	1577	1,583	42.88	43.04	67,875.14
	Single Family	4	1341	1,341	45.23	45.23	60,649.58
	Single Family	11	524	524	42.83	42.83	22,443.93
	Single Family	12	2497	2,499	45.71	45.74	114,222.36
	Single Family	13	655	657	48.22	48.37	31,682.78
	Single Family	16	17	17	43.20	43.20	734.33
	Multifamily	2	5	5	39.05	39.05	195.26
	Multifamily	3	13	13	42.92	42.92	557.93
	Multifamily	4	127	129	43.82	44.51	5,653.39
	Multifamily	12	19	19	43.82	43.82	832.65
	Multifamily	13	8	8	47.57	47.57	380.56
Weatherization	Single Family	1	867	3,966	1.77	8.11	7,030.53
	Single Family	2	2304	11,478	1.22	6.05	13,945.77
	Single Family	3	10015	55,592	0.39	2.19	21,919.93
	Single Family	4	8043	48,183	1.26	7.54	60,662.40
	Single Family	11	5490	28,360	1.26	6.49	35,648.52
	Single Family	12	22537	114,153	2.73	13.84	311,843.17
	Single Family	13	9322	58,821	2.36	14.91	138,970.49
	Single Family	16	112	648	2.12	12.28	1,375.38
	Multifamily	1	171	733	0.65	2.78	474.62
	Multifamily	2	998	4,338	0.46	2.02	2,014.57
	Multifamily	4	1627	8,054	0.52	2.55	4,156.67
	Multifamily	11	778	3,067	0.48	1.88	1,459.59
	Multifamily	12	3692	14,574	1.21	4.76	17,563.13
	Multifamily	13	2126	9,557	1.14	5.10	10,851.02
	Mobile Home	1	34	133	2.69	10.51	357.26
	Mobile Home	2	108	431	2.08	8.32	898.55
	Mobile Home	3	164	652	0.76	3.00	492.65
	Mobile Home	4	66	262	2.56	10.16	670.80
	Mobile Home	11	428	1,861	2.07	8.99	3,847.62
	Mobile Home	12	434	1,634	5.00	18.82	8,169.67
	Mobile Home	13	245	1,111	4.48	20.33	4,981.72
	Mobile Home	16	24	98	4.05	16.53	396.72

Table 55: SCG Detailed Impacts by Climate Zone (therms)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (therms)	Savings per Household (therms)	Total Program Savings (therms)
Clothes Washer	Single Family	All	4,533	4,533	30.88	30.88	139,991
	Multifamily	All	25	25	30.88	30.88	772
	Mobile Home	All	122	122	30.88	30.88	3,768
Duct Test Seal	Single Family	4	4	4	8.03	8.03	32
	Single Family	5	7	7	7.84	7.84	55
	Single Family	6	27	27	20.86	20.86	563
	Single Family	8	308	308	19.89	19.89	6,127
	Single Family	9	531	531	18.75	18.75	9,957
	Single Family	10	1,166	1,166	14.17	14.17	16,525
	Single Family	13	218	218	6.26	6.26	1,364
	Single Family	14	151	151	2.50	2.50	377
	Single Family	15	122	122	32.50	32.50	3,965
	Single Family	16	71	71	13.80	13.80	979
	Mobile Home	4	3	3	8.28	8.28	25
	Mobile Home	9	2	2	7.95	7.95	16
	Mobile Home	14	6	6	3.86	3.86	23
Furnace Clean & Tune	Single Family	5	345	353	0.00	0.00	0
	Single Family	6	466	484	12.89	13.39	6,239
	Single Family	8	3,699	3,829	11.68	12.09	44,728
	Single Family	9	1,590	1,638	11.34	11.68	18,573
	Single Family	10	6,778	6,982	5.47	5.63	38,162
	Single Family	13	5,393	5,519	0.00	0.00	0
	Single Family	14	550	582	0.00	0.00	0
	Single Family	15	566	608	24.35	26.16	14,806
	Single Family	16	380	384	9.06	9.16	3,480
	Mobile Home	5	4	4	1.91	1.91	8
	Mobile Home	6	5	5	0.00	0.00	0
	Mobile Home	8	38	38	12.54	12.54	477
	Mobile Home	9	21	21	11.42	11.42	240
	Mobile Home	10	239	239	0.00	0.00	0
	Mobile Home	13	42	42	0.00	0.00	0
	Mobile Home	14	16	16	0.00	0.00	0
	Mobile Home	15	66	66	25.48	25.48	1,682
	Mobile Home	16	1	1	0.20	0.20	0
Furnace Repair/Replace	Single Family	4	2	2	0.00	0.00	0
	Single Family	5	36	48	0.00	0.00	0
	Single Family	6	471	1,551	0.00	0.00	0
	Single Family	8	6,703	25,146	0.00	0.00	0
	Single Family	9	2,813	9,476	0.00	0.00	0
	Single Family	10	3,487	10,830	0.00	0.00	0
	Single Family	13	920	2,307	0.00	0.00	0
	Single Family	14	561	1,233	0.00	0.00	0
	Single Family	15	102	187	0.00	0.00	0
	Single Family	16	360	1,126	0.00	0.00	0
	Mobile Home	5	1	1	0.00	0.00	0
	Mobile Home	6	3	10	0.00	0.00	0
	Mobile Home	8	34	82	0.00	0.00	0
	Mobile Home	9	27	56	0.00	0.00	0
	Mobile Home	10	101	208	0.00	0.00	0
	Mobile Home	13	13	30	0.00	0.00	0
	Mobile Home	14	26	51	0.00	0.00	0
	Mobile Home	15	12	19	0.00	0.00	0
	Mobile Home	16	4	7	0.00	0.00	0

Table 56: SCG Detailed Impacts by Climate Zone (therms) (cont'd)

Measure Category	House Type	Climate Zone	Number of Households	Number Installed	Savings per unit (therms)	Savings per Household (therms)	Total Program Savings (therms)
Insulation	Single Family	5	148	148	23.30	23.30	3,449
	Single Family	6	328	328	28.28	28.28	9,277
	Single Family	8	2,766	2,766	28.01	28.01	77,475
	Single Family	9	1,757	1,757	27.70	27.70	48,666
	Single Family	10	1,108	1,108	25.99	25.99	28,798
	Single Family	13	1,589	1,589	22.74	22.74	36,134
	Single Family	14	48	48	21.79	21.79	1,046
	Single Family	15	42	42	32.93	32.93	1,383
	Single Family	16	231	231	25.83	25.83	5,967
	Multifamily	6	4	4	27.91	27.91	112
	Multifamily	8	87	87	27.92	27.92	2,429
	Multifamily	9	85	85	28.05	28.05	2,385
	Multifamily	10	23	23	24.08	24.08	554
	Multifamily	13	20	20	22.04	22.04	441
Pilot Light Conversion	Single Family	All	97	103	42.00	44.60	4,326
	Multifamily	All	2	2	42.00	42.00	84
	Mobile Home	All	10	10	42.00	42.00	420
Water Heater Repair/Replace	Single Family	All	1,752	1,752	3.52	3.52	6,166
	Mobile Home	All	67	67	3.52	3.52	236
Weatherization	Single Family	4	234	234	10.40	10.40	2,434
	Single Family	5	1,166	1,166	10.25	10.25	11,956
	Single Family	6	2,352	2,352	0.55	0.55	1,287
	Single Family	8	29,386	29,386	0.68	0.68	20,034
	Single Family	9	15,212	15,212	0.96	0.96	14,677
	Single Family	10	19,418	19,418	5.27	5.27	102,312
	Single Family	13	17,853	17,853	11.36	11.36	202,868
	Single Family	14	2,966	2,966	14.40	14.40	42,724
	Single Family	15	1,776	1,776	0.00	0.00	0
	Single Family	16	1,982	1,982	5.34	5.34	10,587
	Multifamily	4	39	39	10.14	10.14	395
	Multifamily	5	86	86	10.56	10.56	908
	Multifamily	8	5,514	5,514	0.70	0.70	3,885
	Multifamily	9	6,060	6,060	0.76	0.76	4,635
	Multifamily	10	1,357	1,357	6.26	6.26	8,498
	Multifamily	13	753	753	12.46	12.46	9,380
	Multifamily	14	72	72	15.63	15.63	1,125
	Multifamily	16	248	248	5.00	5.00	1,239
	Mobile Home	4	20	20	10.51	10.51	210
	Mobile Home	5	30	30	9.93	9.93	298
	Mobile Home	6	16	16	11.90	11.90	190
	Mobile Home	8	134	134	0.64	0.64	86
	Mobile Home	9	186	186	1.87	1.87	347
	Mobile Home	10	1,285	1,285	12.32	12.32	15,833
	Mobile Home	13	359	359	11.10	11.10	3,983
	Mobile Home	14	184	184	13.98	13.98	2,573
	Mobile Home	15	365	365	0.00	0.00	0
	Mobile Home	16	17	17	13.93	13.93	237
WH Conservation	Single Family	All	96,023	333,347	0.95	3.31	317,441
	Multifamily	All	15,518	46,951	1.09	3.31	51,301
	Mobile Home	All	2,598	9,084	0.95	3.31	8,589

Table 57: SDG&E Measure Grouping

Measure Group for Model	IOU Measure Name
Central AC	Central AC Replacement
Central AC Tune-Up	Central AC Tune-Up
CFL	CFLs
Clothes Washer	High Efficiency Clothes Washer
Ducts	Duct Testing and Sealing
Furnace Repair/Replace	Furnace Clean and Tune
Furnace Repair/Replace	Furnace Repair / Replacement
Hot Water Conservation	Faucet Aerator - Electric
Hot Water Conservation	Faucet Aerator - Gas
Hot Water Conservation	Low Flow Showerhead - Electric
Hot Water Conservation	Low Flow Showerhead - Gas
Hot Water Conservation	Thermostatic Shower Valve - Electric
Hot Water Conservation	Thermostatic Shower Valve - Gas
Hot Water Conservation	Water Heater Blanket - Electric
Hot Water Conservation	Water Heater Blanket - Gas
Hot Water Conservation	Water Heater Pipe Insulation - Electric
Hot Water Conservation	Water Heater Pipe Insulation - Gas
Hard Wired Lights	Exterior Hard Wired CFL Fixtures
Hard Wired Lights	Interior Hard Wired CFL Fixtures
Insulation	Attic Insulation
Lighting	LED Night Lights
Lighting	Torchiere
Other	FAU Standing Pilot Light Conversion
Other	Microwaves
Refrigerator	Refrigerators
Room AC	Room AC Replacement
Water Heater Repair/Replace	Water Heater Repair / Replacement
Weatherization	Air Sealing

Table 58: PG&E Measure Grouping

Measure Group for Model	IOU Measure Name
Central AC	AC <= 6K BTU
Central AC	AC <= 6K BTU Copay
Central AC	AC >10-15K BTU
Central AC	AC >10-15K BTU Copay
Central AC	AC >15K BTU
Central AC	AC >15K BTU Copay
Central AC	AC >6-10K BTU
Central AC	AC >6-10K BTU Copay
Central AC	Central AC
Central AC Tune-Up	AC - Central - Tune-Up (<20%)
Central AC Tune-Up	AC - Central - Tune-Up (>=20%)
CFL	CFL
Ducts	Duct Seal - Electric
Ducts	Duct Seal - Gas
Evaporative Cooler	Evaporative Cooler (W/W) - EEM
Furnace Repair/Replace	Furnace Repair
Furnace Repair/Replace	Furnace Replace
Hot Water Conservation	Faucet Aerators - Electric
Hot Water Conservation	Faucet Aerators - Gas
Hot Water Conservation	Pipe Insulation - Electric
Hot Water Conservation	Pipe Insulation - Gas
Hot Water Conservation	Showerheads - Electric
Hot Water Conservation	Showerheads - Gas
Hot Water Conservation	Water Heater Blanket - Electric
Hot Water Conservation	Water Heater Blanket - Gas
Hard Wired Lights	Hard Wired Lights
Hard Wired Lights	Hard Wired Lights 2-4Plex
Hard Wired Lights	Hard Wired Lights Interior
Insulation	Attic Insulation
Lighting	Occupancy Sensor
Lighting	Torchiere
Refrigerator	CBO Refrigerator
Refrigerator	Refrigerator - Extra Large
Refrigerator	Refrigerator - Extra Small
Refrigerator	Refrigerator - Large
Refrigerator	Refrigerator - Medium
Refrigerator	Refrigerator - Medium - Copay
Refrigerator	Refrigerator - Small
Refrigerator	Refrigerator BFM - Large
Refrigerator	Refrigerator Extra Large - Copay
Refrigerator	Refrigerator Large - Copay
Refrigerator	Refrigerator Side by Side - Large
Refrigerator	Refrigerator Small - Copay

Table 59: PG&E Measure Grouping (cont'd)

Measure Group for Model	IOU Measure Name
Water Heater Repair/Replace	Water Heater Repair
Water Heater Repair/Replace	Water Heater Replace
Weatherization	Attic Access Weather-stripping
Weatherization	Caulking - SF
Weatherization	Caulking 2-4Plex
Weatherization	Caulking Mobile (Flat Fee)
Weatherization	Caulking Mud (Flat Fee)
Weatherization	Caulking SF >200'(In.Ft)
Weatherization	Ceiling Repair
Weatherization	Door Jambs
Weatherization	Door Patch/Plate
Weatherization	Doors Replace
Weatherization	Doors Weather-stripping
Weatherization	Evaporative Cooler Cover
Weatherization	Exhaust Fan Vent Repair-Attic
Weatherization	Exhaust Fan Vent Repair-Dryer
Weatherization	Exhaust Fan Vent Repair-Mobile
Weatherization	Exterior Wall Repair
Weatherization	Floor Repair
Weatherization	Foam Wall Patch
Weatherization	Glass Replace
Weatherization	Glazing Compound
Weatherization	Interior Wall Repair
Weatherization	Specialty Glass $'s
Weatherization	Thresholds Installed
Weatherization	Utility Gaskets
Weatherization	Window Assembly Replace <12 Sq
Weatherization	Window Assembly Replace <12 Sq.
Weatherization	Window Sash Repair

Table 60: SCE Measure Grouping

Measure Group for Model	IOU Measure Name
Central AC	Central AC
Central AC Tune-Up	Maintain Central AC
Central Heat Pump	Central Heat Pump
CFL	CFL
Ducts	Duct Test and Seal
Evaporative Cooler	Evaporative Cooler
Evaporative Cooler Tune-Up	Maintain Evaporative Cooler
Furnace Repair/Replace	Forced Air Furnace
Hot Water Conservation	Faucet Aerators
Hot Water Conservation	Low-Flow Showerhead
Hot Water Conservation	Shower Hardware
Hot Water Conservation	Water Heater Blanket
Hot Water Conservation	Water Heater Pipe Wrap
Insulation	Attic Insulation
Lighting	Light Fixture
Lighting	Torchiere
Other	Attic Ventilation
Other	Programmable Control
Other	Thermostat
Pool Pump	Pool Pump
Refrigerator	Refrigerator
Room AC	Room Air Conditioner
Weatherization	Attic Access Door Installation
Weatherization	Attic Access Weather-stripping
Weatherization	Casing
Weatherization	Caulking
Weatherization	Door Assembly
Weatherization	Door Hardware
Weatherization	Door Replacement
Weatherization	Glass
Weatherization	Outlet Cover Plate Gaskets
Weatherization	Vent Cover
Weatherization	Wall Repair
Weatherization	Weather-stripping
Weatherization	Window - Replace Entire Window
Weatherization	Window Repair

Table 61: SCG Measure Grouping

Measure Group for Model	IOU Measure Name
Clothes Washer	High Efficiency Clothes Washer
Ducts	Duct Sealing
Furnace Repair/Replace	Furnace Clean & Tune
Furnace Repair/Replace	Furnaces
Hot Water Conservation	Hot Water Conservation
Insulation	Attic Insulation
Other	FAU Stand Pilot / Change Out
Water Heater Repair/Replace	Water Heater Replacement
Weatherization	Envelope & Air Sealing

(End of Attachments)